

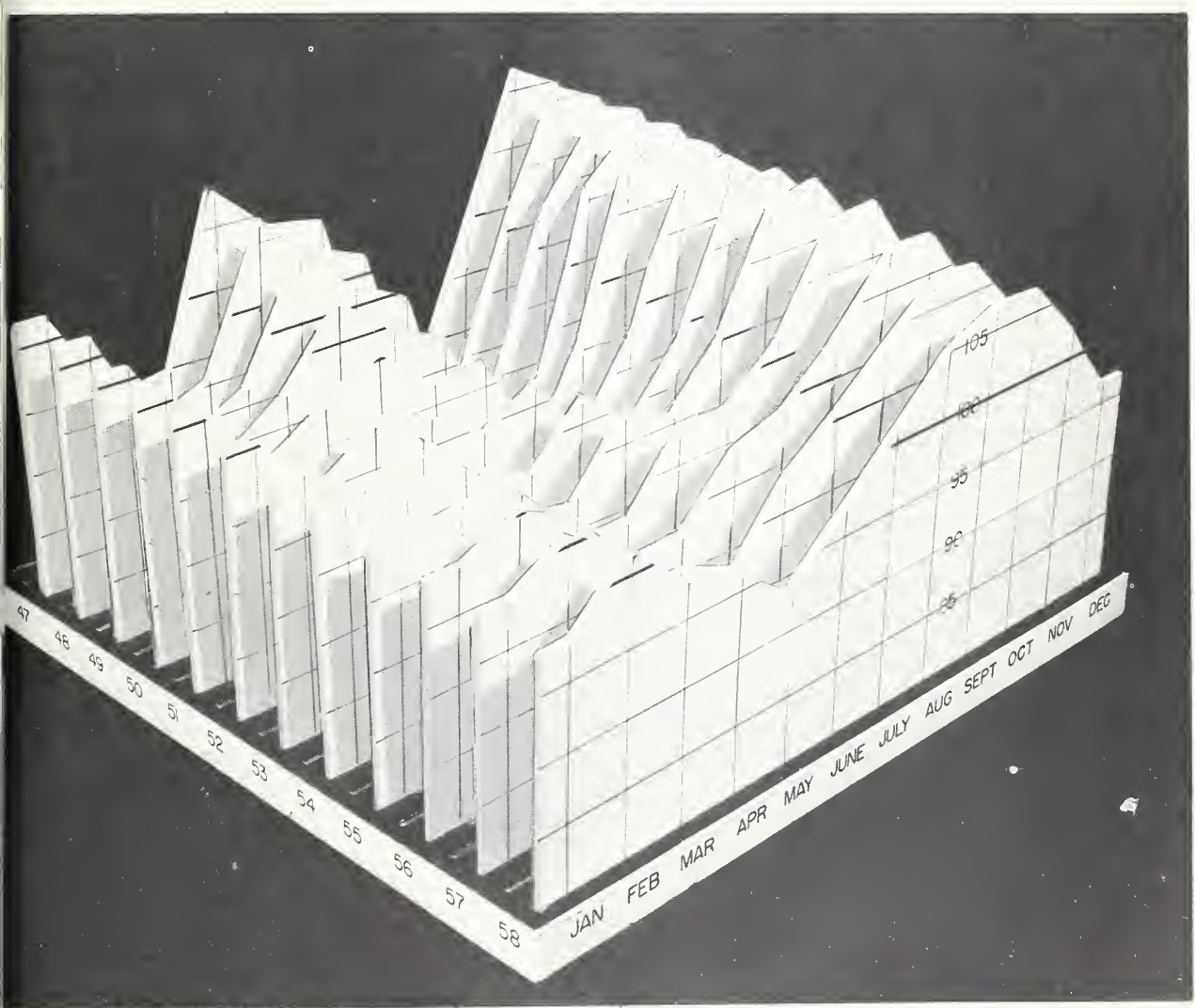
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# Seasonal Variation in FARM FOOD PRICES and PRICE SPREADS



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U. S. DEPARTMENT OF AGRICULTURE

Agricultural Marketing Service  
Marketing Economics Research Division  
MISCELLANEOUS PUBLICATION No. 840



## PREFACE

This report is intended to supplement information published in U. S. Department of Agriculture Miscellaneous Publication 741, Farm-Retail Spreads for Food Products, and in other reports on price spreads for individual farm commodities. The Marketing Economics Research Division, which prepared this report, is responsible for research concerning marketing costs and margins of farm products.

The farm value, retail cost, and farm-retail spread of many farm foods fluctuate seasonally. Both farmers and consumers can benefit from these seasonal variations if they know when and how prices are expected to change. Farmers often can adjust their production pattern to take advantage of higher prices. Consumers, on the other hand, are encouraged by several organizations to increase purchases when prices of particular foods are low. When consumer expenditures rise, returns to farmers should also increase.

The relationship between marketing margins and prices is not always direct. Better information concerning seasonal patterns of margins and prices, and their relationship to one another, will be of value to persons conducting marketing research in identifying areas where savings are likely to be accomplished.

This report was prepared under the direction of Willard F. Williams, former Head of the Marketing Information and Statistics Section, Marketing Economics Research Division, and of Forrest E. Scott, agricultural economist, of the same section. Kenneth J. McCallister, agricultural economist of the Marketing Economics Research Division, assisted in the original preparation of the data and organization of the report. Several other persons in the division contributed to the preparation of the manuscript.

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Washington, D. C.

January 1961

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## SUMMARY

Variations in retail prices, farm values, and farm-retail price spreads of farm food products generally are composed of four principal elements: Trend, cyclical, seasonal, and irregular. For most commodities, seasonal and irregular variations are most important. This report shows the seasonal variation for selected commodities and groups of commodities in the "market basket" (defined on page 7), indicates shifts in seasonal patterns between 1947 and 1958, and outlines some of the reasons for the seasonal variations and their shifts. Computations of the seasonal indexes were carried out by the Bureau of the Census.

Seasonal patterns varied widely among commodities and commodity groups. Seasonal changes for most fruits and vegetables were relatively large, but those for dairy products were small. Eggs, frying chickens, and meat products tended to fall into an intermediate group in magnitude of seasonal variation. Tomatoes showed the widest seasonal fluctuations in prices and spreads of those products reported on here, and fluid milk showed the smallest fluctuations. Month-to-month seasonal changes for the composite market basket were relatively small, mainly because seasonal changes for commodity groups largely offset one another.

Percentage changes in the seasonal index of farm prices usually exceeded percentage changes in seasonal indexes of either retail prices or farm-retail spreads; that is, retail prices and marketing charges usually were more stable seasonally than farm values. Seasonal patterns of all three series, however, usually were related. Seasonally high farm values usually were accompanied by seasonally high retail prices.

The relations of seasonal changes in the spread to changes in either farm or retail prices generally were more complex. For most products other than red meats, seasonal changes in price spreads were directly rather than inversely related to seasonal changes in farm and retail prices. The spreads tended to widen with seasonal increases in prices, but peaks and valleys in spreads usually followed farm price peaks and valleys. There are several basic reasons for this pattern. Increases and decreases in retail prices usually follow similar changes in farm prices, and this causes the spread (1) to continue rising after farm prices have started to drop and (2) to continue dropping after farm prices have begun to rise. Pricing policies of many retailers are based on fixed percentage markups; that is, gross dollar margins increase as prices rise. This policy is the principal reason why price spreads for many products tend to be positively correlated with prices. It also means that, despite equal percentage seasonal changes, retail prices change more seasonally in dollars per unit than do farm values.

Price spreads of some red meats and of some other products exhibited an opposite tendency. They tended to decrease when prices rose and to increase when prices fell. This means that farm prices of these products rise and fall faster (by a larger percentage) than retail prices, and that marketing firms use pricing policies that more nearly reflect fixed dollar markups than fixed percentage markups.

Price spreads or margins and, to a lesser extent, farm and retail prices are affected by seasonal variations in costs incurred by marketing firms. Effects vary, however, among products. When marketings of some products increase seasonally, total marketing costs per unit usually decrease because fixed costs and, in some cases, variable costs per unit drop rapidly. But even with little change in marketings, changes in marketing costs and in farm-retail price spreads sometimes occur as a result of changes in transportation costs. Transportation costs can increase seasonally because of seasonal changes in the proportion of supplies obtained from different producing areas.

For dairy products, poultry and eggs, and most meat products covered in this study, the seasonal component of the total variation in farm prices, retail prices, and farm-retail spreads usually was more influential than the irregular component. This means that, for these commodities, seasonal factors such as seasonal supply or cost variations affected the prices and spreads more than did irregular factors such as unusual weather conditions. The irregular component generally was the more important of the two for many fruits and vegetables. Seasonal variations explained a larger proportion of the price and spread changes for sweetpotatoes and apples than for other commodities included in the study. For cabbage and lettuce, the smallest proportion of retail price and farm value fluctuations was explained by seasonality.

Many products showed relatively large shifts in seasonal patterns between 1947 and 1958. Not all of these shifts, however, could be readily explained. Many of the year-to-year changes in seasonal patterns were erratic; therefore, it was difficult to state definitely that indicated shifts in seasonal patterns for these commodities were real and significant. Meat products and frying chickens were among the commodities for which shifts in seasonal patterns were most significant.



# SEASONAL VARIATION IN FARM FOOD PRICES AND PRICE SPREADS

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## INTRODUCTION

This report describes and analyzes seasonal variation in retail prices, farm values, and farm-retail spreads for 17 of the products used in calculating the U. S. Department of Agriculture's "market basket" statistics. It also gives seasonal indexes for product groups and the market basket.

The market basket contains the average quantities of farm-produced food products purchased for consumption at home by urban wage-earner and clerical worker families in 1952. The Agricultural Marketing Service publishes the total retail cost, farm value, and farm-retail spread of these quantities. With consumption quantities fixed, changes in these values over time represent price changes.

Retail prices used to compute the retail cost of the foods in the market basket are those published by the Bureau of Labor Statistics. These prices are estimates of average prices paid in retail food stores in urban areas in the United States and are based on prices collected each month in 46 cities and towns during the first 3 days of the week which includes the 15th of the month.

The farm value is the payment to farmers for the quantity of the farm product equivalent to a unit of the product sold at the retail level. For example, 1.37 pounds of live broiler at the farm is equivalent to 1 pound of cut-up frying chicken at retail. The payment received by the farmer for the 1.37 pounds of live broilers is the farm value. Farm values of meat, bakery and cereal products, and a few other products are adjusted for byproduct values; that is, the estimated portion of the gross farm value attributed to byproducts is deducted to obtain a net farm value of the food product. Farm prices used in calculating market-basket farm values are the U. S. average prices received by farmers on or near the 15th of each month, published by the Agricultural Marketing Service. Because of byproduct adjustments, seasonal patterns of change in farm values of products having byproducts may differ slightly from seasonal patterns for farm prices of these commodities.

The farm-retail spread of a commodity is the difference between its retail price and farm value, and represents the charges for marketing services. This spread or marketing margin includes all the costs of marketing, including transportation, processing, packaging, merchandising, and profits incurred between the time of first sale by the farmer and the time of purchase by the consumer. Further information concerning the retail price, farm value, and farm-retail spread is presented in Department of Agriculture Miscellaneous Publication 741. 1/

The method of computing the seasonal indexes in this report was developed by the Bureau of the Census, and the calculations were performed on its electronic data processing equipment. The method is explained in the appendix.

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1/ Farm-Retail Spreads for Food Products, Agr. Mktg. Serv., U. S. Dept. Agr., Misc. Pub. 741, Nov. 1957.

## Seasonal Variations and Their Relation to Cyclical and Irregular Factors

Prices of many agricultural products exhibit regular or repetitive movements within the year, commonly known as seasonal variations. But these seasonal changes can be partially or completely obscured by cyclical movements and other variations commonly associated with seasonal changes. To study seasonal patterns of change, it is necessary to remove all other types of change from the data. These other types include longer term trends, cyclical fluctuations, and irregular movements. The seasonal indexes described in this report are "net" in the sense that the influence of trend-cyclical and irregular changes have been removed from the original data.

Strong trends and cyclical movements influence some farm prices. Cattle prices, for example, follow a cyclical pattern moving up irregularly for several years and then falling for several more, mainly as a result of increases and decreases in marketings. Prices of some vegetables tend to follow an alternating pattern from year to year, with large crops and low prices one year and small crops and high prices the next. Prices also change irregularly from day to day or from week to week.

The presence of a strong seasonal pattern in prices does not mean, necessarily, that prices as observed in the market during any particular year will follow the seasonal pattern. Adherence to the seasonal pattern depends on the relative strength of forces causing seasonal variations and those causing other types of price movements. The stronger the influence of seasonal factors is relative to other factors, the greater the probability that prices will conform to a seasonal pattern.

The trend-cyclical, seasonal, and irregular movements in data were separated by techniques described in the appendix, and "average amplitudes" of each resulting series of data and of the original series were computed (table 1). Average amplitudes are average month-to-month percentage changes, disregarding direction of change. The larger the amplitude of the original series, the larger, ordinarily, are the amplitudes of both the seasonal and the irregular series. By comparing the amplitude of the seasonal index with the average amplitudes of the original series and the irregular variations, the reader can judge the relative importance and "predictability" of the seasonal index. These comparisons are provided in the form of ratios (table 2). The larger the irregular-seasonal ratio, the smaller is the probability that future prices will approximate the seasonal pattern. The smaller the ratio, the closer is the correspondence between the original series and the seasonal index, and the greater the probability that future prices will follow the seasonal pattern. For the market basket of farm foods, the irregular-seasonal ratios of the retail cost and farm value are about equal to one.

Seasonal price movements of some agricultural commodities shift or change gradually over time. The illustration on the front cover shows average seasonal indexes for the farm-retail spread for pork, centered on each successive year from 1947 to 1958. Average seasonal indexes centered on a single year, however, may be distorted by abnormal price situations and may indicate a shift in the seasonal pattern when no significant shift has occurred. Seasonal indexes for 1947 and 1958 are shown in the charts only for commodities for which production and marketing information indicated a significant shift; for commodities for which no meaningful changes occurred, only the seasonal index for the 12-year period is shown.

The shaded area around the seasonal index on the charts is the average month-to-month irregular change not accounted for by the changing seasonal index or the trend-cycle factor. Where two seasonal indexes are shown, the shaded area is centered around the 1958 seasonal. The width of the shaded area relative to the amplitude of the seasonal index gives a visual approximation of the reliability of the seasonal indexes.

Table 1.--Average amplitudes for retail cost, farm value, and farm-retail spread for selected commodities in the "market basket" <sup>1/</sup>

Commodity or group	Retail cost			Farm value			Farm-retail spread		
	Original	Seasonal	Irregular	Original	Seasonal	Irregular	Original	Seasonal	Irregular
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Market basket . . . . .	0.95	0.59	0.54	1.80	1.03	0.99	1.24	0.89	0.69
Meat products . . . . .	2.20	1.58	1.05	3.39	2.27	1.77	4.21	2.50	3.08
Beef . . . . .	2.08	1.32	1.16	3.40	1.99	1.64	5.11	2.63	3.62
Pork . . . . .	3.17	2.40	1.50	6.20	4.60	3.32	6.63	4.42	4.35
Lamb . . . . .	3.22	2.50	1.69	3.72	2.50	2.44	7.28	5.18	4.36
Dairy products . . . . .	.88	.63	.33	1.68	1.28	.52	.83	.41	.50
Fluid milk . . . . .	1.01	.82	.41	1.76	1.53	.64	.97	.56	.62
Butter . . . . .	1.81	.85	1.18	1.99	1.08	1.06	3.06	1.34	2.56
Cheese <sup>2/</sup> . . . . .	.54	.26	.43	1.45	1.04	.74	1.55	.87	.99
Evaporated milk . . . . .	.71	.37	.44	1.91	1.19	.82	1.90	1.17	1.02
Ice cream <sup>3/</sup> . . . . .	.21	.16	.14	1.20	.85	.68	.42	.28	.28
Eggs . . . . .	5.04	3.61	2.97	6.13	4.06	3.48	6.29	4.27	3.91
Frying chicken <sup>4/</sup> . . . . .	2.85	1.91	1.56	5.64	4.15	2.94	5.06	3.53	3.51
Fresh fruits and vegetables . . . . .	3.82	3.08	1.80	6.83	4.37	4.48	4.80	3.92	2.40
Apples . . . . .	7.68	6.77	2.69	7.13	5.32	3.45	10.77	9.44	4.69
Oranges . . . . .	5.43	4.08	3.00	17.31	12.06	10.77	7.56	5.65	4.60
Lemons . . . . .	4.09	2.56	2.97	18.00	10.29	14.00	8.53	5.11	6.47
Fresh vegetables . . . . .	5.64	4.30	3.17	10.54	6.69	7.10	5.09	3.84	2.75
Green beans . . . . .	14.64	9.95	9.57	23.18	13.86	16.12	13.55	8.72	9.67
Cabbage . . . . .	11.59	6.06	8.58	31.94	12.41	27.46	9.66	6.88	5.65
Lettuce . . . . .	13.11	6.09	10.61	28.78	12.49	23.60	10.54	5.76	8.03
Tomatoes <sup>4/</sup> . . . . .	17.15	13.02	8.94	32.34	21.34	19.18	17.41	14.18	9.16
Carrots . . . . .	5.81	3.40	3.87	18.82	13.33	11.03	6.85	4.56	4.11
Onions . . . . .	9.02	5.30	5.94	22.73	11.52	17.09	10.12	4.55	7.86
Sweetpotatoes . . . . .	7.22	6.24	2.79	10.70	8.76	5.12	8.62	7.17	3.70
Potatoes . . . . .	6.48	4.10	3.39	11.56	5.28	7.49	7.28	4.90	4.24

<sup>1/</sup> Average amplitudes are average month-to-month percentage changes (disregarding direction), 1947-58.

<sup>2/</sup> 1949-58.

<sup>3/</sup> 1951-58.

<sup>4/</sup> 1950-58.

Table 2.--Ratios of amplitudes for retail cost, farm value, and farm-retail spread for selected commodities in the market basket 1/

Commodity or group	Retail cost			Farm value			Farm-retail spread		
	Sea- sonal to origi- nal	Irregu- lar to origi- nal	Irregu- lar to sea- sonal	Sea- sonal to origi- nal	Irregu- lar to origi- nal	Irregu- lar to sea- sonal	Sea- sonal to origi- nal	Irregu- lar to origi- nal	Irregu- lar to sea- sonal
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Market basket . . . . .	0.62	0.57	0.92	0.57	0.55	0.96	0.72	0.56	0.78
Meat products . . . . .	.72	.48	.66	.67	.52	.78	.59	.73	1.23
Beef . . . . .	.63	.56	.88	.59	.48	.82	.51	.71	1.38
Pork . . . . .	.76	.47	.63	.74	.54	.72	.67	.66	.98
Lamb . . . . .	.78	.52	.68	.67	.66	.98	.71	.60	.84
Dairy products . . . . .	.72	.38	.52	.76	.31	.41	.49	.60	1.22
Fluid milk . . . . .	.81	.41	.50	.87	.36	.42	.58	.64	1.11
Butter . . . . .	.47	.65	1.39	.54	.53	.98	.44	.84	1.91
Cheese <u>2/</u> . . . . .	.48	.80	1.65	.72	.51	.71	.56	.64	1.14
Evaporated milk . . . . .	.52	.62	1.19	.62	.43	.69	.62	.54	.87
Ice cream <u>3/</u> . . . . .	.76	.67	.88	.71	.57	.80	.67	.67	1.00
Eggs . . . . .	.72	.59	.82	.66	.57	.86	.68	.62	.92
Frying chicken <u>4/</u> . . . . .	.67	.55	.82	.74	.52	.71	.70	.69	.99
Fresh fruits and vegetables . . . . .	.81	.47	.58	.64	.66	1.03	.82	.50	.61
Apples . . . . .	.88	.35	.40	.75	.48	.65	.88	.44	.50
Oranges . . . . .	.75	.55	.74	.70	.62	.89	.75	.61	.81
Lemons . . . . .	.63	.73	1.16	.57	.78	1.36	.60	.76	1.27
Fresh vegetables . . . . .	.76	.56	.74	.63	.67	1.06	.75	.54	.72
Green beans . . . . .	.68	.65	.96	.60	.70	1.16	.64	.71	1.11
Cabbage . . . . .	.52	.74	1.42	.39	.86	2.21	.71	.58	.82
Lettuce . . . . .	.46	.81	1.74	.43	.82	1.89	.55	.76	1.39
Tomatoes <u>4/</u> . . . . .	.76	.52	.69	.66	.59	.90	.81	.53	.65
Carrots . . . . .	.59	.67	1.14	.71	.59	.83	.67	.60	.90
Onions . . . . .	.59	.66	1.12	.51	.75	1.48	.45	.78	1.73
Sweetpotatoes . . . . .	.86	.39	.45	.82	.48	.58	.83	.43	.52
Potatoes . . . . .	.63	.52	.83	.46	.65	1.42	.67	.58	.87

1/ Average amplitudes are average month-to-month percentage changes (disregarding direction), 1947-58.

2/ 1949-58.

3/ 1951-58.

4/ 1950-58.

## THE FARM FOOD MARKET BASKET

The market basket of farm foods is composed of 60 domestic farm food products, divided into 6 specific commodity groups and 1 miscellaneous commodity group. <sup>2/</sup> Three groups, meat products, poultry and eggs, and fresh fruits and vegetables, are responsible for most of the seasonal fluctuations in the retail cost, farm value, and farm-retail spread of the market basket. Each of the three product groups has wide seasonal fluctuations, but they tend to offset one another, so seasonal variations in the market-basket series are relatively small.

In 1958, seasonal patterns in the farm value and retail cost of the market basket were related both in direction and magnitude (fig. 1). The farm-retail spread followed the same general pattern as the other two series, but the relationship was less clearly defined. Commodities that have large seasonal variations in production, such as meat products and fresh vegetables, tend to have similar seasonal farm and retail price patterns. Since these commodities have the greatest effect on the market-basket totals, the farm value and retail cost of the market basket also are positively related. For some commodities, seasonal variations in farm values greatly exceed seasonal fluctuations in retail prices; as a result, seasonal movements in the spread tend to be inverse to seasonal movements in the farm value. Farm values, retail costs, and farm-retail spreads of the bakery and cereal products exhibit little seasonal variation and do not greatly affect the seasonality of the market basket.

The seasonal indexes of each of the three market-basket series appeared to be less variable in 1958 than in 1947, although the reductions were slight. Much of the reduction may be attributed to the meat products group. Meat products, fruits and vegetables, and poultry and eggs all had lower values in the last 4 months of the 1958 seasonal index than in the 1947 index, causing the market basket to be seasonally lower during those months in 1958. Fresh fruits and vegetables, however, had higher seasonal values in retail price and in farm value in the spring and summer of 1958 than in 1947, which helped to raise the corresponding market-basket seasonals for those months.

Seasonal and irregular factors affected the retail cost and farm value of the market basket about equally. The ratio of the irregular amplitude to the seasonal amplitude for the farm-retail spread, however, was smaller than the ratio for either the retail cost or farm value (table 2).

### MEAT PRODUCTS GROUP

The principal change in seasonality of the meat products group <sup>3/</sup> during 1947-58 was a reduction in the degree of variation at the farm and retail levels and in the farm-retail spread (fig. 2). Although meat prices usually are relatively low in the winter and relatively high in late summer, this pattern has become less distinct in recent years.

Seasonal changes in retail costs of the meat products group and of each individual species appear to be gradually diminishing, mainly because of a reduction in seasonal variation in supplies. The maximum farm value occurred in September in the 1947 index and in August in the 1958 index; the 1958 maximum was less than that for 1947. The lowest values are early in the year in the 1947 index and late in the year in the 1958 index. Another possible reason for the reduction in seasonality of retail prices

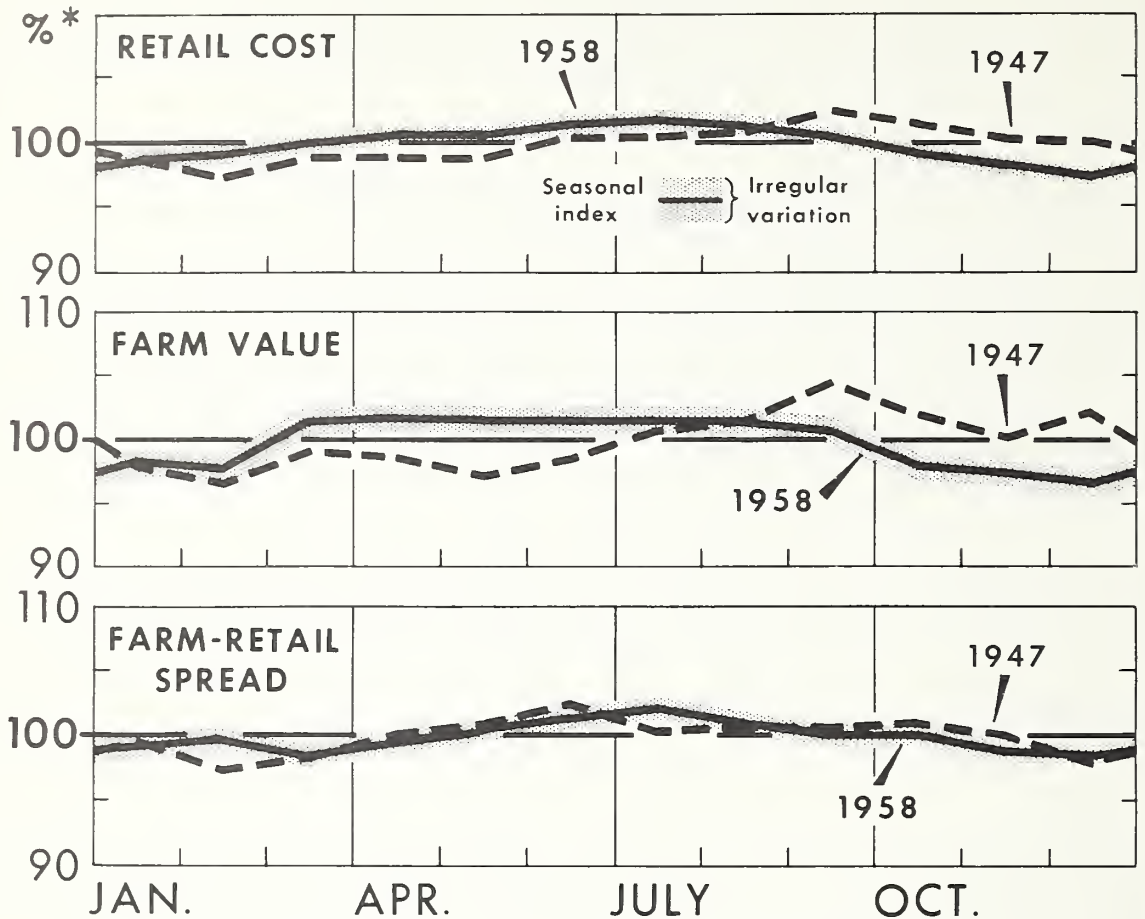
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<sup>2/</sup> The six groups are: Meat products, dairy products, poultry and eggs, fruits and vegetables, bakery and cereal products, and fats and oils. Information concerning these commodity groups may be found in Misc. Pub. 741, U. S. Dept. Agr.

<sup>3/</sup> This group includes beef, pork, lamb, and veal.

Seasonal Indexes

# MARKET BASKET



BASED ON DATA FOR 1947-58

\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

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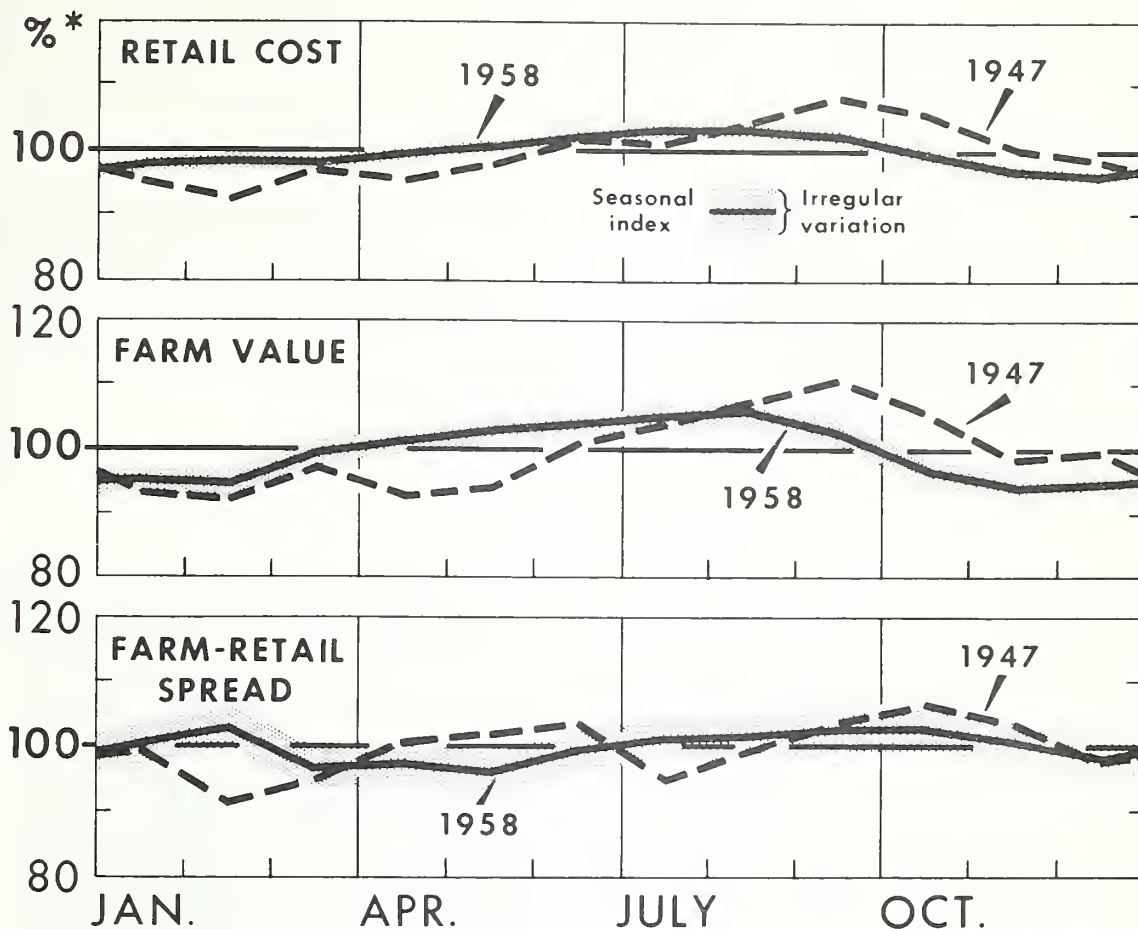
Figure 1

Table 3.--Market basket: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Retail cost:												
1947.....	98.9	97.2	99.1	99.1	99.1	100.4	100.4	101.0	102.5	101.6	100.3	100.1
1958.....	99.0	99.2	99.9	100.5	100.5	101.6	102.0	101.3	100.4	99.3	98.4	97.8
1947-58 ..	99.3	98.4	99.0	99.4	99.8	100.8	101.3	101.1	101.2	100.6	99.7	99.3
Farm value:												
1947.....	98.1	96.7	99.2	98.9	97.4	98.7	100.7	101.5	104.5	102.1	100.1	102.2
1958.....	98.4	98.1	101.6	101.9	101.7	101.6	101.7	101.6	100.8	98.2	97.7	96.8
1947-58 ..	98.9	98.0	99.6	99.7	99.7	99.8	101.1	101.9	102.4	100.1	99.6	99.2
Farm-retail spread:												
1947.....	99.7	97.6	98.3	100.0	101.0	102.5	100.2	100.5	100.5	101.1	100.1	98.1
1958.....	99.4	99.8	98.5	99.5	100.2	101.5	102.2	101.1	100.1	100.1	98.9	98.6
1947-58 ..	99.7	98.7	98.5	99.4	100.1	101.7	101.6	100.4	100.2	100.8	99.7	99.3

Seasonal Indexes

# MEAT PRODUCTS



BASED ON DATA FOR 1947-58

\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7856-60 (1) AGRICULTURAL MARKETING SERVICE

Figure 2

Table 4.--Meat products: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Retail cost:</b>												
1947.....	95.5	92.6	97.3	95.4	98.0	101.8	101.0	104.7	108.3	106.2	100.5	98.6
1958.....	98.0	98.8	98.3	99.8	100.3	102.1	103.5	103.4	102.7	99.6	97.1	96.3
1947-58 ..	97.9	97.0	97.6	97.8	99.4	101.4	101.2	103.1	104.8	102.7	99.2	98.1
<b>Farm value:</b>												
1947.....	93.5	92.6	97.6	93.2	94.5	101.0	104.2	107.5	111.0	106.2	98.9	99.6
1958.....	95.9	95.0	99.4	101.3	103.4	104.0	105.2	106.1	102.7	97.2	94.6	95.1
1947-58 ..	96.1	95.4	97.6	98.1	100.4	101.7	103.8	105.8	105.8	101.5	97.3	96.5
<b>Farm-retail spread:</b>												
1947.....	99.8	91.9	95.0	100.3	102.2	103.5	95.2	99.9	104.0	106.7	103.9	97.7
1958.....	100.2	103.2	96.8	97.5	96.5	99.9	101.0	101.5	102.7	102.8	100.3	98.0
1947-58 ..	100.8	97.7	96.9	97.6	98.0	101.6	97.8	99.6	103.5	104.3	102.0	100.1

is the exclusion of weekend price specials from the data. During the time covered by this report, the Bureau of Labor Statistics did not include weekend prices in its retail price averages. A tendency for retailers to substitute weekend price reductions for more general price reductions in periods of heavy supply may have developed in recent years. Stable nonsale prices probably would tend to increase the effectiveness of weekend specials. Another reason for the decline in seasonality may have been the increase in the volume of processed meat and improved methods of preservation. The conversion of large quantities of fresh meat into less perishable forms and storage of this meat during seasons of peak production tend to stabilize supply and prices of fresh meat.

Seasonal swings in the farm value and farm-retail spread for the meat products group also moderated during the 1947-58 period. Seasonal factors were more important than irregular factors in explaining movements of the retail cost and farm value of the meat products group (tables 1 and 2). For the farm-retail spread, however, the amplitude of the irregular component was larger than the seasonal component. Despite a reduction in the seasonal deviation of meat prices from their annual averages between 1947 and 1958, the importance of these seasonal deviations generally increased relative to the influence of irregular factors.

### Choice Grade Beef

Retail prices and farm values for U. S. Choice grade beef had similar seasonal patterns (fig. 3). In recent years, however, seasonality in retail prices became more stable than seasonality in farm prices. The 1947 retail price index varied from 8 percent below average in February to 7 percent above average in August and September. But the 1958 retail price index varied only from 2 percent above to 2 percent below the yearly average.

Farm values for U. S. Choice grade beef respond rapidly to changes in supplies of Choice grade slaughter cattle, and consequently changes in the seasonality of Choice grade marketings during 1947-58 altered the seasonality of farm values. Expanded feeding operations by farmers and commercial feedlots in recent years have tended to transform seasonally concentrated supplies of grass-fed cattle marketings into a more evenly distributed supply of higher grade and heavier cattle. With more orderly marketings of Choice grade cattle throughout the year, fluctuations in the seasonal pattern of farm values have been reduced. As a result of less seasonal variation in farm values, retail price seasonality also was less.

The seasonal path of farm-retail spreads for U. S. Choice grade beef in 1947 was similar to the seasonal paths followed by the retail price and farm value. The new relationship between retail and farm prices has greatly reduced seasonal changes in the farm-retail spread. Reductions in the seasonal variations of both retail prices and farm values of Choice beef have resulted in a relatively stable seasonal farm-retail spread.

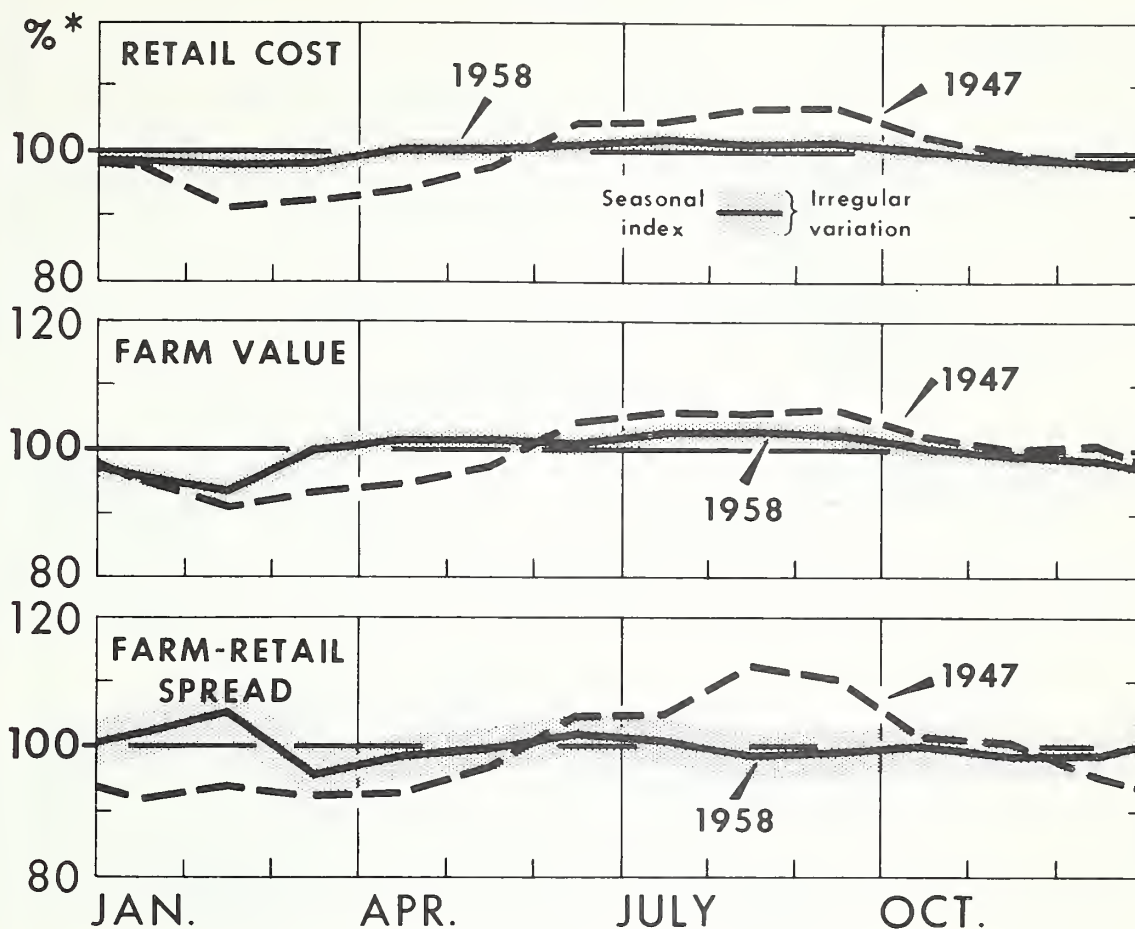
### Pork

Farm prices of hogs have a more definite seasonal pattern than farm prices of the other meat animals. Retail prices of pork also vary seasonally, but to a lesser extent than do farm prices of hogs. Seasonal patterns of both farm and retail values of pork are inverse to the seasonal pattern of hog production. Hog prices typically advance during the spring and early summer, when marketings are approaching the seasonal low, and decline in response to sharp increases in marketings during the fall (fig. 4).



Seasonal Indexes

**BEEF<sup>o</sup>**



BASED ON DATA FOR 1947-58  
<sup>o</sup> U. S. CHOICE GRADE

\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7857-60 (4) AGRICULTURAL MARKETING SERVICE

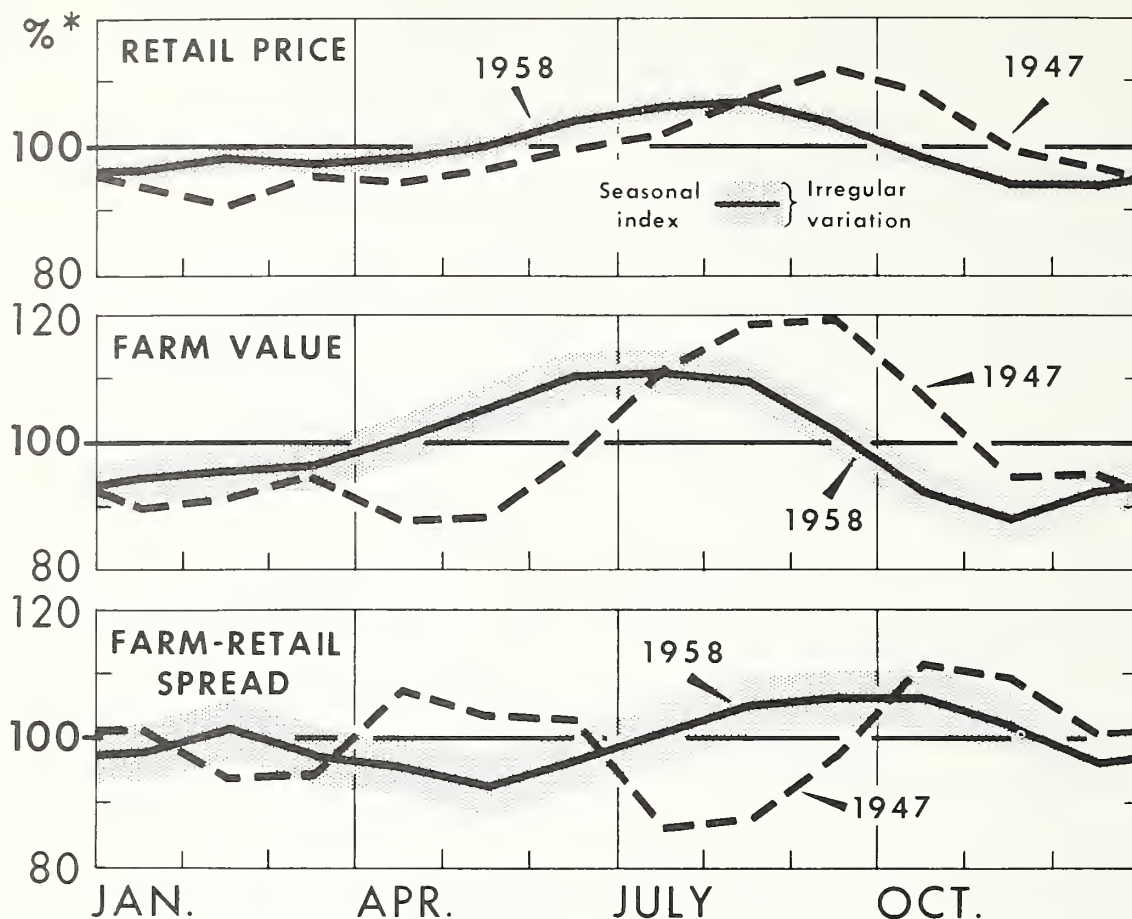
Figure 3

Table 5.--Beef, Choice grade: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Retail cost:</b>												
1947.....	97.6	91.8	92.9	94.3	97.9	104.5	105.1	107.2	107.2	103.1	99.9	98.4
1958.....	98.8	98.2	98.1	100.3	100.6	101.2	102.1	101.4	101.6	100.1	99.0	98.7
1947-58 ..	99.2	96.4	96.2	97.4	98.9	101.4	101.7	102.8	103.4	101.9	100.9	99.7
<b>Farm value:</b>												
1947.....	95.6	91.5	93.8	95.2	97.7	104.6	106.0	105.7	106.3	102.7	100.2	100.5
1958.....	96.0	93.7	99.7	101.7	101.7	101.0	102.7	103.1	102.4	100.5	99.0	98.8
1947-58 ..	97.7	94.1	96.5	98.3	98.8	99.9	102.1	103.3	104.4	103.2	101.8	100.0
<b>Farm-retail spread:</b>												
1947.....	92.1	94.2	92.4	93.2	97.2	104.9	105.0	112.7	110.7	101.5	100.7	95.4
1958.....	102.3	105.4	95.9	98.6	99.7	102.2	100.7	98.5	99.3	99.9	98.6	98.9
1947-58 ..	99.2	99.8	95.9	96.3	99.5	105.4	103.2	103.5	101.1	99.6	98.0	98.5

Seasonal Indexes

# PORK<sup>o</sup>



BASED ON DATA FOR 1947-58  
<sup>o</sup> RETAIL CUTS

\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7858-60 (4) AGRICULTURAL MARKETING SERVICE

Figure 4

Table 6.--Pork: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Retail cost:												
1947.....	94.1	91.0	95.6	94.8	96.6	99.9	102.3	107.9	112.1	109.0	99.7	97.3
1958.....	96.5	98.4	97.4	98.5	100.0	104.2	106.6	107.5	103.8	98.4	94.5	94.3
1947-58 ..	95.6	95.8	96.5	96.7	99.2	103.0	104.4	106.7	107.1	102.8	96.9	95.2
Farm value:												
1947.....	90.2	91.4	95.2	88.2	88.5	98.5	111.6	118.6	119.5	107.8	95.1	95.4
1958.....	94.9	95.8	96.6	100.4	105.6	110.5	111.1	109.6	102.0	92.8	88.5	92.4
1947-58 ..	92.6	95.2	95.5	96.2	101.1	106.9	112.4	112.8	107.6	98.3	89.7	91.6
Farm-retail spread:												
1947.....	101.7	93.9	94.7	107.7	103.8	103.2	86.4	87.9	98.6	111.7	109.7	100.9
1958.....	97.9	101.5	97.5	95.9	92.8	96.9	100.6	105.1	106.8	106.5	102.1	96.5
1947-58 ..	100.0	96.7	97.5	98.7	96.0	98.3	92.7	97.0	106.3	109.4	106.2	101.0

The farm-retail spread tends to be inversely related to hog prices and retail pork prices, but this relation was not as evident in 1958 as in 1947. As hog marketings drop seasonally, farm prices increase faster than retail prices, and the farm-retail spread narrows. A part of this seasonal contraction in the spread is due to factors affecting the packer-wholesaler portion of the overall farm-retail spread. These factors can be explained in two ways: As there is a rather fixed and inflexible supply of hog marketing services during the short run in terms of plant facilities and labor supply, (1) a dwindling supply of hogs causes sharply increased buying competition among packers that is not matched by a similar increase in competition among retailers for pork, or (2) diminishing demand for hog marketing services forces packers to take a lower margin--or price--for their processing and wholesaling services. Conversely, when hog marketings are increasing seasonally, hog prices drop and the farm-retail spread widens. During these seasons, packers compete less actively with one another as the demand for their hog marketing services increases. Lags in adjustments between farm and wholesale prices and between wholesale and retail prices also contribute to the expansion of the farm-retail spread when prices are dropping, and to the contraction when prices rise.

The two important changes which took place in the seasonal pattern of pork prices and of the farm-retail spread were the gradual reduction in the price variations and a shift in the seasonal price pattern so that seasonal highs and lows were earlier in 1958 than in 1947. Both of these changes were due largely to corresponding changes in the seasonal pattern of hog marketings. Earlier farrowings and feeding for faster gain have shifted the marketing pattern. A more nearly equal balance between fall and spring pig crops and some tendency toward more year-round farrowings have smoothed seasonal variations in marketings.

#### Choice Grade Lamb

Retail prices, farm values, and the farm-retail spread for U. S. Choice grade lamb all followed a similar seasonal pattern (fig. 5). Each series rose to a seasonal high during the spring or early summer and then declined in the fall. While all three series held the same general pattern during the 1947-58 period, seasonal changes in each became less marked. This tendency toward greater seasonal stability in prices was similar to that observed for the other species of meat animals.

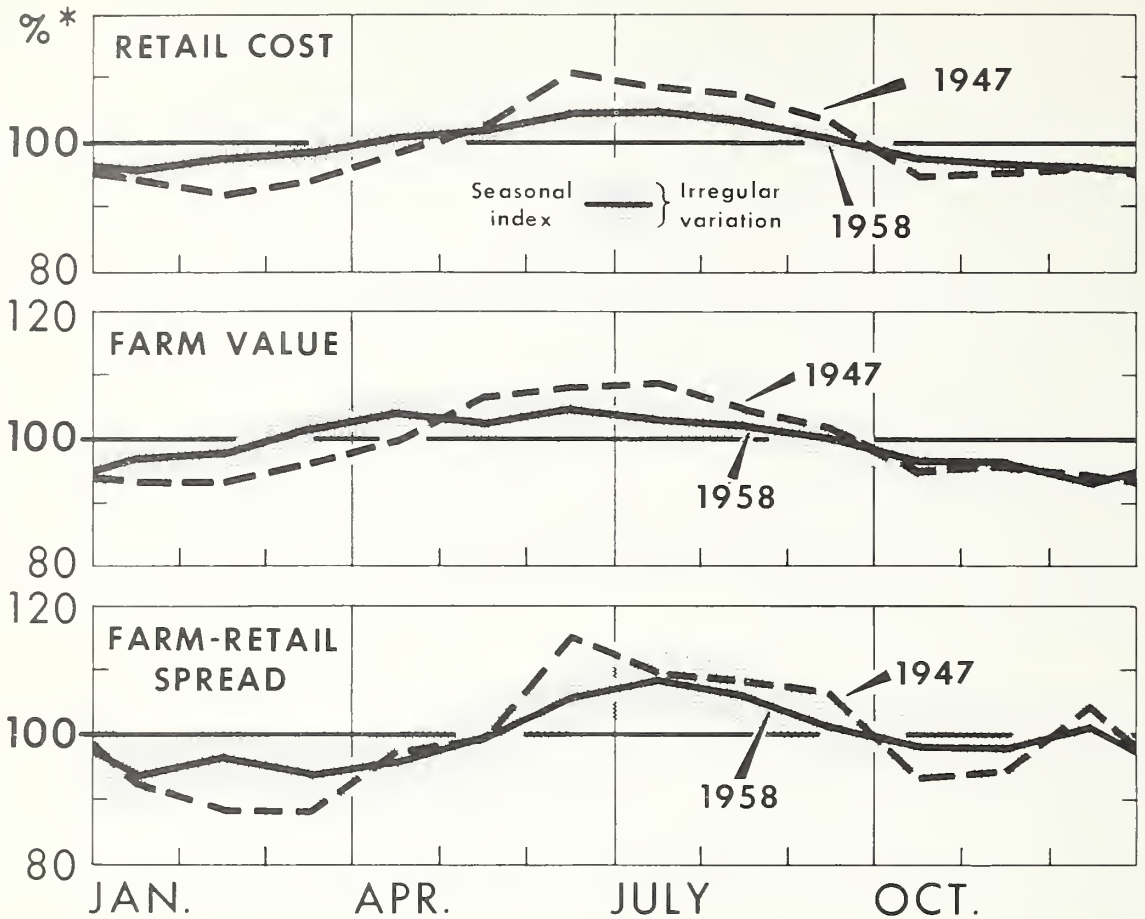
Feeding of lambs, like that of cattle, tended to smooth out the supply of lamb marketings throughout the year. As a result, reductions in seasonal variations in supplies exerted a stabilizing influence on retail prices and farm values. This, in turn, reduced the seasonal fluctuation in the farm-retail spread.

The direct relationship between the seasonal patterns of prices and the spread for U. S. Choice grade lamb was in contrast to that observed for pork. In absolute terms, retail prices of lamb appeared to rise and fall faster than farm values. Consequently, the spread tended to widen seasonally during periods of rising farm and retail prices and to narrow when prices were falling. Both prices and the spread were inversely related to the seasonal pattern of lamb marketings. Thus, a given change in the supply of lambs brought about a greater absolute change in retail prices than in farm value of lambs.

Seasonality in the farm-retail spread may not be indicative of supply conditions, since many packers do not expect lamb slaughtering operations to produce a profit from month to month. Many packers slaughter lambs in order to supply customers with a complete line of meats. Per capita consumption of lamb is 4 pounds per year compared to about 60 pounds of pork and 80 pounds of beef. As a result, volume is often so small that packers are not greatly concerned with changes in the margin from month to month. On a yearly basis, however, they probably expect at least to cover costs of lamb slaughtering.

Seasonal Indexes

# LAMB<sup>o</sup>



BASED ON DATA FOR 1947-58 \* PERCENT OF THE ANNUAL AVERAGE  
<sup>o</sup> U. S. CHOICE GRADE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7859-60 (4) AGRICULTURAL MARKETING SERVICE

Figure 5

Table 7.--Lamb: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Retail cost:												
1947.....	94.6	92.0	94.0	98.5	103.1	111.2	108.8	107.4	103.5	95.0	95.6	96.2
1958.....	95.9	97.8	98.5	100.6	102.1	104.8	105.2	103.8	100.2	97.7	96.9	96.5
1947-58 ..	96.0	94.9	95.3	99.7	103.7	108.1	106.9	103.8	100.8	96.7	96.6	97.4
Farm value:												
1947.....	93.5	93.6	96.4	99.7	106.8	108.2	108.8	104.7	102.1	95.3	96.0	94.7
1958.....	97.2	98.2	101.6	104.1	102.8	104.9	103.0	102.2	100.0	96.7	96.2	93.3
1947-58 ..	95.1	96.2	99.9	103.4	105.4	107.4	105.2	102.9	100.0	96.2	95.4	92.9
Farm-retail spread:												
1947.....	92.8	88.6	88.3	97.4	99.7	115.4	109.9	108.6	107.2	93.4	94.3	104.5
1958.....	94.0	96.7	94.0	95.9	99.8	106.0	108.6	106.3	101.0	98.5	98.2	101.0
1947-58 ..	97.1	92.8	87.8	94.1	100.1	108.5	108.9	105.0	102.5	98.0	99.0	106.2

## DAIRY PRODUCTS

The farm value of milk used for fluid consumption accounts for about 60 percent of the farm value of the dairy products group, so seasonal movements in the farm value of the group mainly reflect the seasonality in the farm value of fluid milk (fig. 6). These seasonal changes in fluid milk prices are tempered slightly by the smaller seasonal changes in manufactured dairy products. Farm prices of milk used for manufacturing purposes are less variable than farm prices of milk used for fluid consumption, partly because prices of manufacturing milk are supported by Government purchasing programs for butter, cheddar cheese, and nonfat dry milk.

The range of seasonal variation in the farm value of the dairy products group declined slightly between 1947 and 1958. The increased effectiveness of price supports since 1948 has helped reduce seasonality in farm values of manufactured dairy products; seasonality in the farm value of fluid milk, which was not supported, increased slightly.

Marketing margins of individual dairy products tend to offset each other seasonally, so the spread for the dairy group fluctuates little. Changes in the 1947-58 seasonal index of the farm-retail spread were slight, varying less than 1 percent from the yearly average. As a result of the relative stability in the spread, the retail cost showed a seasonal pattern similar to that of the farm value, but with a smaller seasonal fluctuation.

Variations in the retail and farm series caused by seasonal factors were small, but the seasonal factors explained a large proportion of the total variation in the retail cost and farm value of this group. The irregular-seasonal ratio for the farm value was smaller than that for any other product or product group.

Discussion of seasonal variation in prices and spreads of some manufactured dairy products was omitted because month-to-month changes were small and were similar to seasonal movements for butter, which are described later in this report. Indexes for American process cheese, evaporated milk, and ice cream are presented in tables 11, 12, and 13.

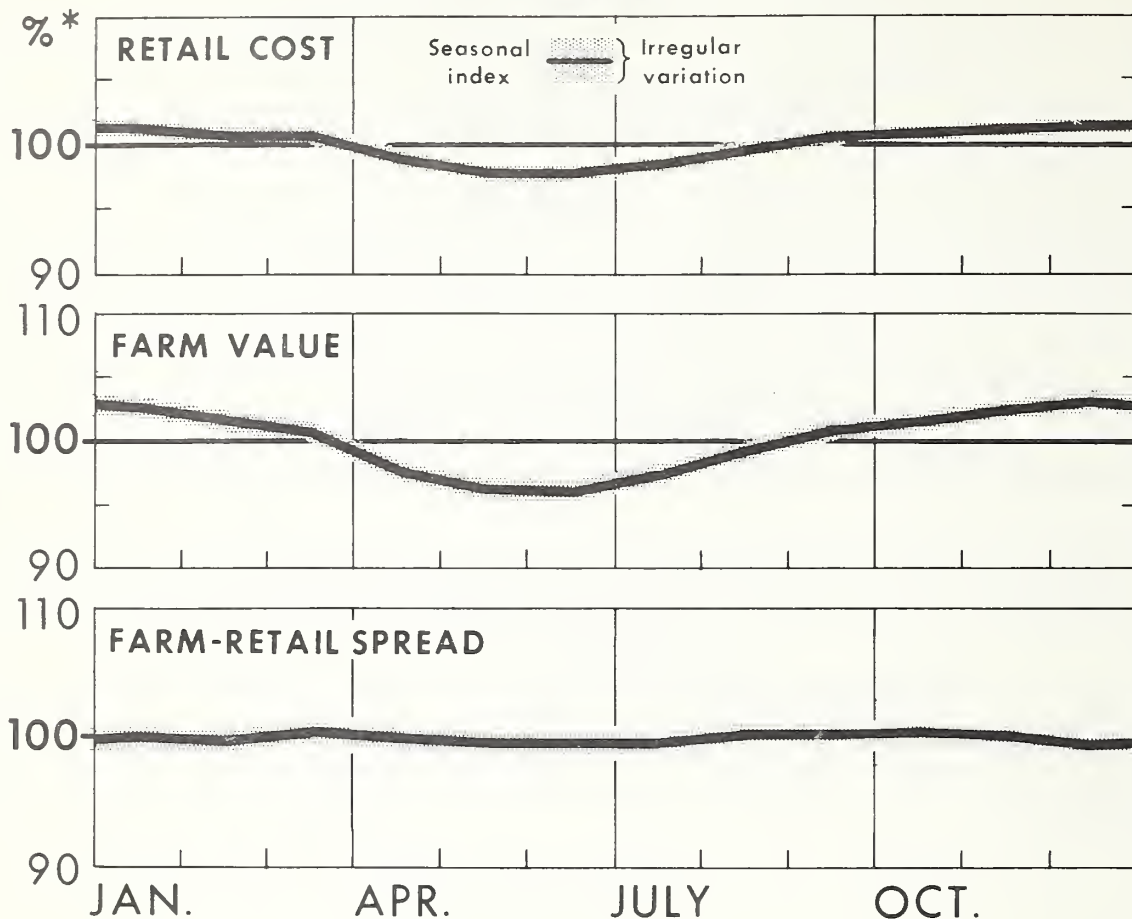
### Fluid Milk

Seasonality in the farm value was greater for milk used for fluid consumption than for the farm value of any other dairy product in the market basket. The farm value of fluid milk reflects the farm price of milk actually used for fluid consumption. Not all milk eligible for fluid use is consumed in that form--considerable quantities are diverted to making manufactured products. Therefore, the farmer usually receives a "blend" price, based on the price and percentage of his milk that is used for fluid consumption and the price and percentage of that diverted to manufacturing channels. The diversion of varying quantities of "eligible milk" into manufacturing channels during the year tends to keep supply and demand of fluid milk in balance. Consumer demand for fluid milk remains relatively stable throughout the year and supplies of fluid milk are usually regulated to satisfy demand. Thus, prices of milk used for fluid consumption remained fairly stable seasonally compared to seasonal changes in milk production (fig. 7).

Seasonal changes in the farm value and in production of fluid milk were inversely related. The farm value was lowest in May and June when production was greatest, and seasonally high in the last quarter of the calendar year when production was smallest. Seasonal changes in the farm-retail spread were small, varying less than 1 percent from the yearly average in 1958. Most seasonal changes in the farm value apparently were passed along to the consumer. As a result, seasonal variation in retail price was similar to variation in the farm value. Percentage changes in the retail-cost seasonal indexes were smaller than those in the farm value index.

Seasonal Indexes, 1947-58

# DAIRY PRODUCTS



BASED ON DATA FOR 1947-58

\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7840-60 (4) AGRICULTURAL MARKETING SERVICE

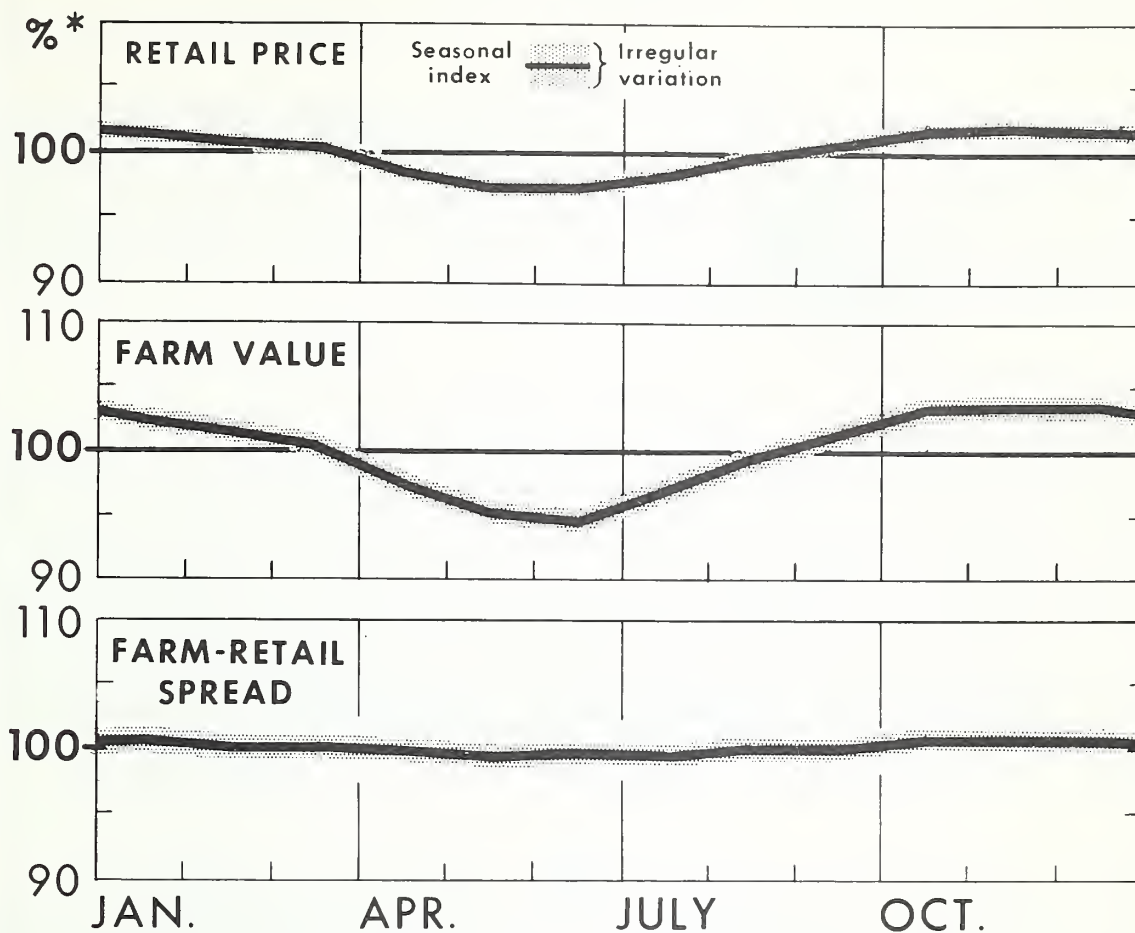
Figure 6

Table 8.--Dairy products: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Retail cost:												
1947.....	102.5	100.6	100.9	99.1	97.0	97.5	98.2	99.6	101.1	100.4	101.5	101.9
1958.....	100.9	100.6	100.1	99.1	98.6	98.4	98.8	99.5	100.4	101.2	101.2	101.2
1947-58 ..	101.5	100.9	100.5	99.0	98.0	97.9	98.6	99.6	100.4	101.0	101.3	101.5
Farm value:												
1947.....	104.5	101.3	101.5	99.5	95.8	95.8	97.7	99.7	101.2	99.7	100.2	103.0
1958.....	101.8	101.3	100.0	97.4	96.3	96.2	97.6	99.4	101.5	102.5	102.9	102.9
1947-58 ..	102.8	101.8	100.6	97.8	96.1	96.0	97.5	99.2	100.9	101.7	102.4	103.1
Farm-retail spread:												
1947.....	99.9	99.7	100.0	98.6	98.4	98.4	98.9	99.9	101.1	101.8	102.7	100.5
1958.....	100.0	99.9	100.3	100.6	100.5	100.4	99.8	99.8	99.6	100.0	99.7	99.6
1947-58 ..	100.0	99.9	100.2	100.0	99.8	99.8	99.8	100.1	100.1	100.5	100.1	99.7

Seasonal Indexes, 1947-58

# FLUID MILK



BASED ON DATA FOR 1947-58

\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7841-60 (4) AGRICULTURAL MARKETING SERVICE

Figure 7

Table 9.--Fluid milk: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Retail cost:</b>												
1947.....	102.0	100.7	99.9	98.7	96.8	96.8	97.7	99.8	100.6	102.0	102.8	102.1
1958.....	101.2	100.8	100.0	98.6	98.0	97.6	98.0	99.5	100.6	101.7	102.0	101.9
1947-58 ..	101.4	100.8	100.1	98.5	97.5	97.2	98.3	99.8	100.6	101.8	102.1	101.9
<b>Farm value:</b>												
1947.....	103.1	101.4	100.1	98.9	95.7	95.3	97.6	100.0	100.6	102.3	102.3	102.8
1958.....	102.4	101.2	99.4	96.5	94.9	94.4	96.8	99.5	102.5	104.0	104.7	104.0
1947-58 ..	102.5	101.5	100.1	97.3	95.2	94.9	97.1	99.5	101.4	103.2	103.7	103.7
<b>Farm-retail spread:</b>												
1947.....	101.4	99.7	100.0	97.7	98.4	98.2	98.5	99.7	100.8	101.8	102.9	100.9
1958.....	100.4	100.6	100.7	100.4	100.1	100.1	99.1	99.2	99.3	99.9	100.1	100.1
1947-58 ..	100.4	100.0	100.0	99.8	99.4	99.5	99.4	99.9	99.9	100.6	100.7	100.4

Seasonal changes explained a high proportion of the variation in the farm value of fluid milk, although these changes were relatively small. The ratio of the irregular amplitude to the seasonal amplitude was smaller than for the farm value of any other product in this report (table 2).

### Butter

Seasonal changes in the farm value, retail price, and farm-retail spread indexes of butter are small (fig. 8). Butter production during the year is closely related to milk production, but prices are stabilized considerably by storage and Government purchases of butter. Because of Government supports and the resulting stability of butter prices, both seasonal and irregular variations in the farm value of butter were relatively small. For the farm-retail spread and retail price, the irregular amplitude was considerably larger than the seasonal amplitude.

## POULTRY PRODUCTS

Data for frying chickens and eggs were not combined and analyzed as a single group because their production and marketing characteristics differ distinctly. Both products have well-defined but dissimilar seasonal patterns with respect to retail price, farm value, and farm-retail spread. The retail price and farm value of eggs generally were seasonally below the annual average in the first 7 months of the calendar year and above average during the remainder of the year. In contrast, prices of frying chickens tended to be above the annual average during the first part of the year and to be below during the latter part. Thus, seasonal indexes of retail prices and farm values for frying chickens and eggs combined would be relatively stable throughout the year. Amplitudes of seasonal variation did not change materially for either product, but some shifts in the seasonal patterns were apparent.

### Eggs

Seasonal changes in retail and farm prices of eggs during 1947-58 were similar (fig. 9). Variation in production during the year is the major cause of seasonality in egg prices. These prices were lowest in the spring when production reached a peak, and prices increased through the summer and fall as production declined. Other factors which may cause seasonal changes in egg prices are: Changes in the proportion of large eggs on the market, demand for hatching eggs, and quality of eggs.

The seasonal index of the farm-retail spread generally moved in the same direction as farm and retail prices, indicating that unit costs of marketing eggs tend to increase with decreases in the volume of eggs marketed. The amplitude of seasonal variations in the spread index was larger than in either the retail price or farm value index.

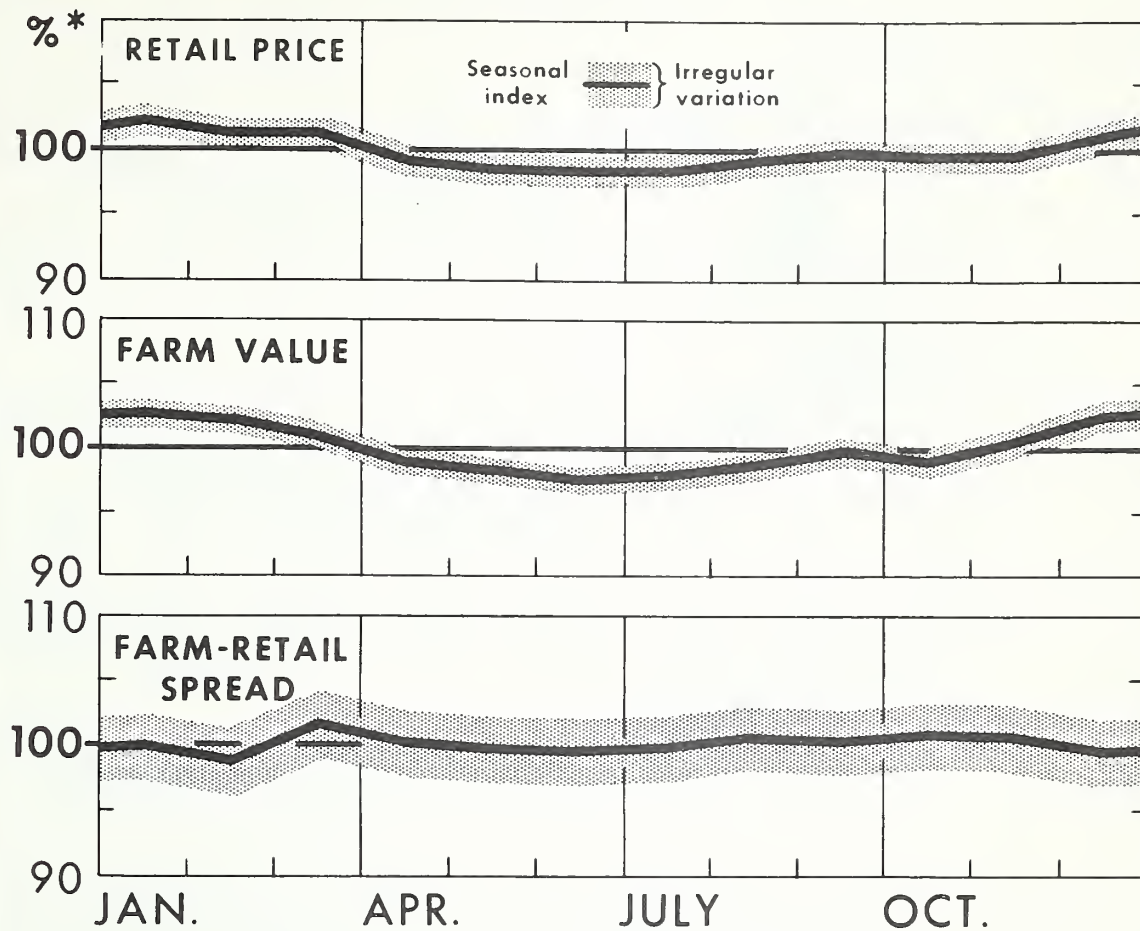
### Frying Chickens

The farm value and retail price of frying chickens had about the same seasonal patterns (fig. 10). The range or amplitude of variation, however, was larger for the farm value than for the retail price. In the recent years studied, marketings and the farm value increased seasonally in the first and second quarters. In the third quarter, however, the farm value tended to drop seasonally as marketings continued at a high level. In the fourth quarter, marketings and the farm value tended to drop, with the result that both usually were at their seasonal lows by the end of the year.



Seasonal Indexes, 1947-58

# BUTTER



\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7842-60 (4) AGRICULTURAL MARKETING SERVICE

Figure 8

Table 10.--Butter: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Retail cost:</b>												
1947.....	102.1	99.1	101.0	100.2	99.6	98.9	99.8	100.9	102.1	96.7	97.9	101.7
1958.....	100.6	100.3	100.2	99.4	99.4	99.2	99.1	99.1	100.2	101.0	100.6	100.6
1947-58 ..	102.2	101.3	101.2	99.3	98.8	98.5	98.7	99.2	99.9	99.7	99.8	101.2
<b>Farm value:</b>												
1947.....	104.9	100.7	101.3	100.4	98.1	97.7	98.1	100.7	101.7	95.0	97.7	103.8
1958.....	100.7	100.9	100.4	98.9	99.3	99.1	98.8	99.0	100.6	100.3	100.5	101.5
1947-58 ..	102.9	102.2	101.0	99.0	98.3	97.9	98.0	98.9	99.9	99.1	100.3	102.3
<b>Farm-retail spread:</b>												
1947.....	95.2	94.8	99.6	102.5	100.5	99.5	100.1	101.2	103.2	98.8	103.2	101.4
1958.....	100.5	99.3	99.8	100.1	99.5	99.3	99.6	99.4	99.6	102.4	101.2	99.3
1947-58 ..	99.9	98.8	101.5	100.0	99.3	99.5	99.8	100.3	100.2	100.7	100.4	99.5

Table 11.--American cheese: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1949-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Retail cost:												
1949.....	102.0	100.9	100.7	100.5	99.4	99.2	99.0	99.5	99.6	99.5	100.0	100.2
1958.....	100.1	100.2	100.3	100.1	99.8	100.1	100.1	100.0	99.9	99.9	99.9	100.1
1949-58 ..	100.9	100.6	100.6	100.2	99.7	99.5	99.5	99.6	99.7	99.7	100.0	100.1
Farm value:												
1949.....	105.8	103.1	100.7	99.2	98.1	97.8	96.4	98.2	98.9	99.2	100.4	102.4
1958.....	101.8	102.2	101.1	98.3	98.0	98.4	98.2	99.1	99.3	100.6	101.4	101.4
1949-58 ..	103.3	102.3	100.6	98.3	97.6	97.4	97.5	98.6	99.6	100.6	101.8	102.3
Farm-retail spread:												
1949.....	100.0	98.3	100.8	100.9	100.9	100.9	102.0	100.1	100.4	99.6	99.3	96.8
1958.....	98.3	98.0	99.4	101.6	101.6	101.9	101.7	101.0	100.4	99.3	98.3	98.5
1949-58 ..	98.6	98.7	100.6	101.9	102.0	101.7	101.6	100.5	99.8	98.8	98.1	97.7

Table 12.--Evaporated milk: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Retail cost:												
1947.....	101.2	101.9	101.4	99.8	98.9	99.1	98.6	99.5	99.6	99.8	99.5	100.4
1958.....	100.0	100.0	99.8	100.0	100.0	100.3	100.3	100.4	100.1	100.1	99.4	99.4
1947-58 ..	100.4	100.9	100.6	99.9	99.5	99.8	99.5	99.9	99.9	100.0	99.6	99.8
Farm value:												
1947.....	106.2	102.5	102.1	100.1	97.2	97.2	97.9	98.7	100.3	97.4	97.9	102.6
1958.....	103.2	103.9	102.2	99.2	97.4	97.6	97.6	97.6	98.4	98.6	100.8	103.3
1947-58 ..	103.5	102.9	102.0	99.4	97.3	97.5	97.4	98.1	99.2	99.1	100.8	102.8
Farm-retail spread:												
1947.....	97.0	103.3	100.3	98.5	100.9	102.3	100.7	98.9	100.3	99.6	101.1	97.3
1958.....	97.7	97.2	98.4	100.6	101.7	102.3	102.9	101.9	101.4	100.1	98.5	97.4
1947-58 ..	97.7	99.5	99.5	100.5	101.7	102.2	101.7	101.0	100.7	99.9	98.5	97.0

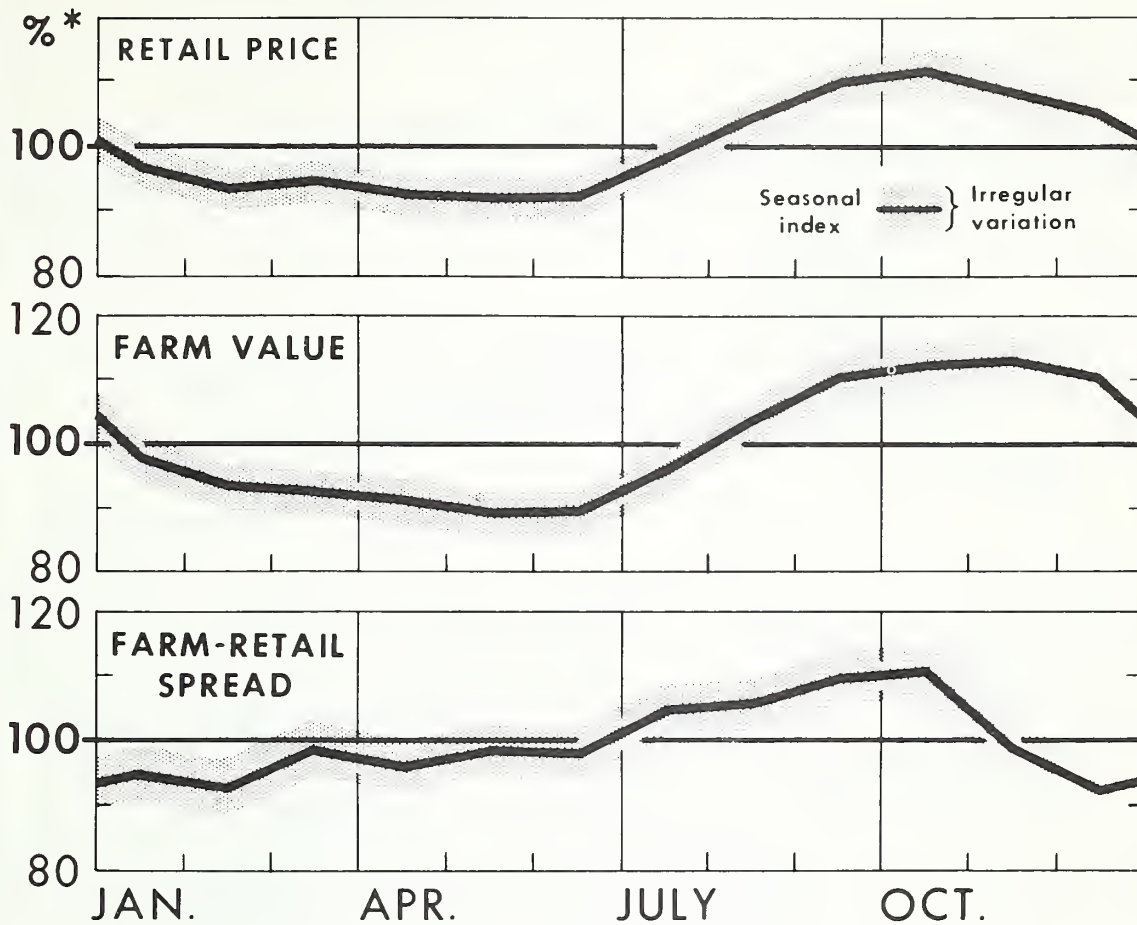
Table 13.--Ice cream: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1951-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Retail cost:												
1951 <sup>1/</sup> .....	100.0	100.9	100.7	100.3	99.9	99.9	99.7	99.9	99.7	99.9	99.7	99.7
1958.....	99.9	99.8	99.8	100.0	100.2	100.1	100.0	100.2	100.3	100.1	99.9	99.8
1951-58 ..	100.1	100.2	100.1	100.1	100.0	99.9	99.8	100.0	100.1	100.1	99.9	99.8
Farm value:												
1951.....	104.8	104.3	100.4	97.9	97.1	96.6	97.0	98.0	100.3	100.0	100.7	102.9
1958.....	101.0	101.0	100.8	99.9	99.9	99.7	98.1	98.1	99.9	99.9	100.1	101.7
1951-58 ..	102.4	102.2	100.6	98.9	98.3	97.9	97.8	98.2	100.1	100.4	101.0	102.1
Farm-retail spread:												
1951.....	98.7	99.4	100.6	101.1	100.5	100.8	100.5	100.2	99.9	99.7	99.5	99.0
1958.....	99.8	99.6	99.6	100.2	100.2	100.2	100.4	100.6	100.2	100.0	99.8	99.4
1951-58 ..	99.5	99.6	100.0	100.6	100.3	100.5	100.3	100.4	100.1	99.9	99.7	99.3

<sup>1/</sup> 1951-58.

Seasonal Indexes, 1947-58

# EGGS



\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7839-60 (4) AGRICULTURAL MARKETING SERVICE

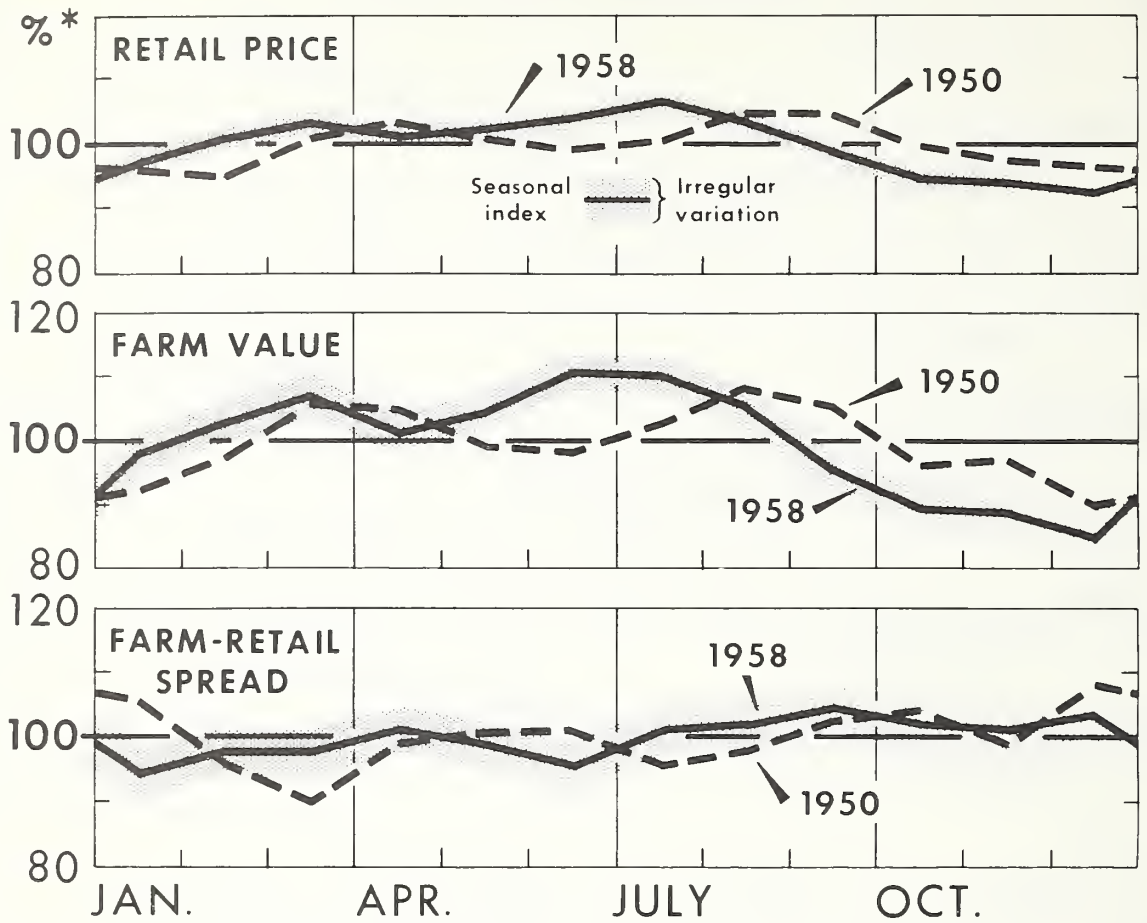
Figure 9

Table 14.--Eggs: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Retail cost:</b>												
1947.....	97.0	90.1	91.8	91.4	92.0	94.1	99.9	104.3	110.8	112.3	110.4	106.0
1958.....	100.0	97.2	98.5	94.3	90.8	88.2	94.9	100.2	110.1	110.4	108.6	106.7
1947-58 ..	97.3	93.4	94.4	92.8	92.1	92.2	98.5	104.3	109.8	111.5	108.7	105.0
<b>Farm value:</b>												
1947.....	96.8	89.5	88.7	89.0	87.8	90.3	97.3	103.4	111.2	115.8	115.8	114.3
1958.....	100.6	96.9	97.3	93.2	88.5	86.4	92.3	99.3	110.2	110.6	113.6	110.9
1947-58 ..	98.0	93.3	92.4	91.1	89.2	89.7	96.1	103.6	110.5	112.3	113.1	110.5
<b>Farm-retail spread:</b>												
1947.....	96.0	90.8	98.7	96.6	102.2	103.6	107.2	108.1	111.3	104.5	96.9	84.2
1958.....	98.6	97.4	101.1	96.4	95.8	92.0	100.4	101.9	110.3	110.0	98.0	98.1
1947-58 ..	95.0	92.7	98.4	96.1	98.4	98.0	104.6	105.5	109.5	110.4	99.2	92.2

Seasonal Indexes

# FRYING CHICKEN<sup>o</sup>



BASED ON DATA FOR 1950-58 \* PERCENT OF THE ANNUAL AVERAGE  
<sup>o</sup> READY TO COOK

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7860-60 (4) AGRICULTURAL MARKETING SERVICE

Figure 10

Table 15.--Frying chicken: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1950-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Retail cost:												
1950.....	96.0	95.3	101.1	103.5	100.8	99.0	100.5	105.0	104.7	99.6	97.8	96.9
1958.....	96.7	100.8	103.4	101.1	102.4	104.2	106.4	103.8	99.1	94.9	94.3	92.8
1950-58 ..	97.2	99.0	101.5	101.9	100.7	100.5	102.6	103.9	102.4	97.7	96.7	95.8
Farm value:												
1950.....	92.7	97.5	105.9	105.2	99.4	98.2	103.1	108.2	105.4	96.5	97.1	90.8
1958.....	98.3	103.2	107.2	101.2	104.8	110.7	110.3	105.5	95.4	89.5	88.8	85.0
1950-58 ..	96.5	99.7	104.5	103.4	101.6	103.1	106.6	107.0	101.6	93.9	93.6	88.4
Farm-retail spread:												
1950.....	105.8	96.2	90.5	99.2	100.5	100.8	95.4	97.7	102.4	104.1	99.1	108.2
1958.....	94.5	97.7	97.9	100.9	98.7	95.9	100.9	102.1	104.7	102.0	100.9	103.4
1950-58 ..	99.5	98.9	95.7	99.7	98.6	98.2	96.9	99.2	103.5	102.8	100.3	106.8

The general tendency for the farm value and marketings of frying chickens to rise and fall together was partly explained by seasonal shifts in demand and the response of producers to these shifts. Changes in production, however, usually were smaller than changes in demand. In the summer, demand for frying chicken increases as a result of smaller supplies of red meat and increased use of chicken for both indoor and outdoor meals. In the later months of the year, demand weakens, but producers do not reduce supplies proportionally.

Seasonal patterns of farm value and retail price shifted between 1950 and 1958. (The Bureau of Labor Statistics did not collect retail prices of frying chickens before April 1949.) All of the first 7 months of the year except April were higher in the 1958 index than in the 1950 index; but all of the last 5 months of the year were lower than in the 1950 index. These shifts were caused mainly by a decrease in the proportion of annual marketings during the summer and an increase in the proportion during the fall.

The farm-retail spread tended to vary inversely with farm and retail prices; it was relatively high seasonally when prices were low and relatively low when prices were high. This relation was explained principally by the tendency of retail prices to be more stable than farm prices.

### FRESH FRUITS AND VEGETABLES

The fruit and vegetable group in the market basket is made up of two subgroups, fresh fruits and vegetables and processed fruits and vegetables. Only 10 items in the fresh group are considered in this publication. Fruits and vegetables marketed by farmers during only part of the year, which include most fruits and vegetables for processing, are omitted. Seasonal variations in retail prices of processed products are small.

Month-to-month percentage changes in the original data series, as well as in the seasonal indexes generally, were larger for individual fresh vegetables than for fresh fruits (table 1). Month-to-month variations in farm values of fresh tomatoes, cabbage, lettuce, and green beans were unusually large. The amplitudes of change in farm prices were larger for perishable fruits and vegetables than for the storage crops. Amplitudes of month-to-month price changes at the farm level were smallest for apples, sweet-potatoes, and potatoes. Oranges, lemons, and carrots were in an intermediate position with regard to seasonal changes in the farm value, but they ranked lowest in average amplitude of retail prices.

The ratio of irregular to seasonal changes was large for some fresh fruits and vegetables and small for others (table 16). Commodities having strong seasonal patterns relative to irregular fluctuations were apples, oranges, tomatoes, and sweet-potatoes. Prices and spreads for carrots and potatoes were affected about equally by seasonal and irregular factors. Prices of the remaining commodities were more strongly affected by irregular factors.

Seasonal indexes of the farm value of the fresh fruit and vegetable group reached a peak in the spring, while indexes of the retail cost and farm-retail spread reached a peak in the early summer (fig. 11). During the summer and early fall, the farm and retail indexes declined, mainly because of increased marketings of many fruits and vegetables, and the farm-value index increased during the winter as supplies diminished.

Table 16.--Ratio of irregular amplitude to seasonal amplitude for selected fresh fruits and vegetables <sup>1/</sup>

Item	Farm value	Farm-retail spread	Retail price
	Ratio	Ratio	Ratio
Group I: <sup>2/</sup>			
Sweetpotatoes . . . . .	0.58	0.52	0.45
Apples . . . . .	.65	.50	.40
Oranges . . . . .	.89	.81	.74
Tomatoes . . . . .	.90	.65	.69
Carrots . . . . .	.83	.90	1.14
Potatoes . . . . .	1.42	.87	.83
Group II: <sup>3/</sup>			
Green beans . . . . .	1.16	1.11	.96
Cabbage . . . . .	2.21	.82	1.42
Onions . . . . .	1.48	1.73	1.12
Lettuce . . . . .	1.89	1.39	1.74

<sup>1/</sup> Ratios less than 1 indicate that the seasonal factor is relatively more important than the irregular factor in explaining variations in prices or spreads. Ratios greater than 1 indicate that the seasonal factor is less important.

<sup>2/</sup> Commodities which tend to have a stronger seasonal component.

<sup>3/</sup> Commodities which tend to have a stronger irregular component.

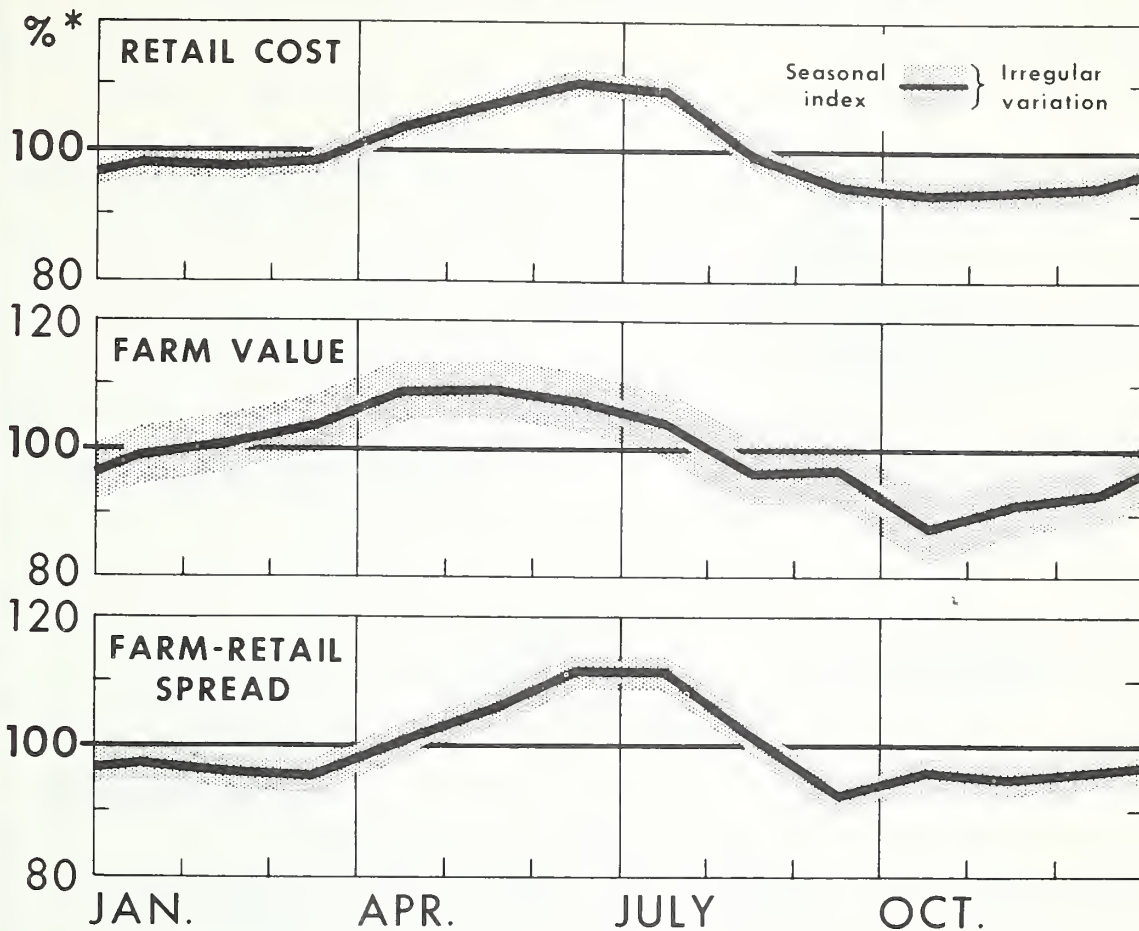
#### Fresh Fruits

The retail cost, farm value, and farm-retail spread of the fresh fruit group are not published. For that reason, seasonal indexes for the fresh fruit group were not computed. Seasonal indexes for lemons were computed, but are not given in this report because irregular factors appeared to have more influence than seasonal factors on the retail price, farm value, and spread (table 1). Fluctuations in the farm value have been frequent and have had a relatively large average amplitude. Although marketings usually reached a peak in the early summer, the farm value tended to average a little higher during the summer when demand generally was stronger than at other times of the year. Demand tended to fluctuate irregularly, however, even during the summer. Fluctuations in the farm value tended to be at least partially offset by changes in the farm-retail spread. The retail price of lemons has been relatively stable, particularly in recent years.

#### Apples

The retail price, farm value, and farm-retail spread for apples all showed wide seasonal fluctuations (fig. 12). All three series followed the same general pattern; that is, seasonally high prices and spread at midyear and seasonally low prices and spread in the fall. The spread for apples, unlike those for most commodities, had a larger seasonal amplitude than the retail price and farm value. As supplies of apples diminish during the first half of the year, farm prices tend to increase. Storage costs tend to increase farm and retail prices during the spring. When the new marketing season begins in July, farm and retail prices usually drop, but farm prices usually drop faster than retail prices.

# FRESH FRUITS AND VEGETABLES



\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

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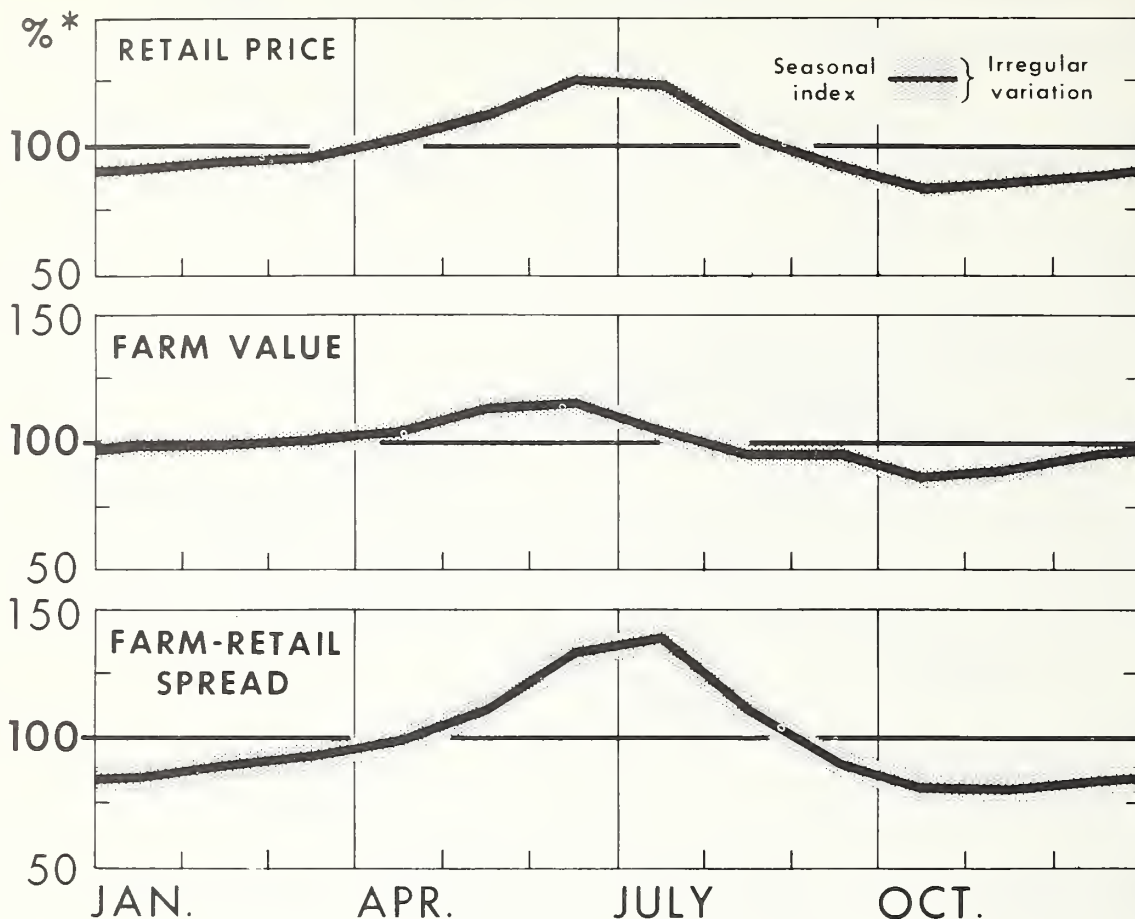
Figure 11

Table 17.--Fresh fruits and vegetables: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Retail cost:</b>												
1947.....	97.1	99.7	100.7	105.1	107.6	107.1	104.0	98.2	96.6	95.1	94.1	94.5
1958.....	95.8	96.2	100.0	106.6	110.4	113.7	110.2	100.4	93.9	92.0	91.2	89.8
1947-58 ..	98.0	97.5	98.6	103.5	107.0	110.6	109.2	99.6	94.4	93.1	93.8	94.7
<b>Farm value:</b>												
1947.....	96.5	105.8	105.5	111.3	109.8	101.4	102.9	94.6	99.4	88.3	89.4	95.3
1958.....	95.4	96.2	103.8	116.8	113.7	114.3	106.4	98.7	96.0	87.8	87.9	82.9
1947-58 ..	99.2	100.4	103.7	109.1	109.5	107.7	103.9	96.7	97.0	87.8	91.5	93.4
<b>Farm-retail spread:</b>												
1947.....	98.7	96.1	96.9	100.8	105.7	111.5	105.2	99.6	92.3	99.5	97.6	95.8
1958.....	96.1	96.3	94.6	99.9	107.8	112.4	113.2	103.9	93.7	94.3	93.2	94.5
1947-58 ..	97.5	96.2	95.3	100.5	105.5	111.8	111.7	101.3	92.7	96.1	95.3	96.0

Seasonal Indexes, 1947-58

# APPLES



\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7844-60 (4) AGRICULTURAL MARKETING SERVICE

Figure 12

Table 18.--Apples: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Retail cost:												
1947.....	94.2	95.9	98.3	102.0	109.6	122.4	113.6	94.2	93.7	91.0	92.0	93.1
1958.....	87.9	91.1	92.9	101.6	116.2	134.4	129.7	116.0	90.7	78.5	78.0	83.0
1947-58 ..	91.5	94.1	96.7	102.1	111.6	125.7	124.1	103.5	92.7	83.9	85.3	88.7
Farm value:												
1947.....	98.4	100.0	101.0	99.5	104.4	105.8	105.6	92.7	103.8	93.1	96.2	99.5
1958.....	96.5	95.0	97.7	111.2	125.7	134.0	104.3	104.2	83.7	76.8	82.4	88.6
1947-58 ..	99.9	99.4	100.6	104.2	112.2	115.4	103.4	95.7	95.7	86.9	90.5	96.0
Farm-retail spread:												
1947.....	91.3	92.4	96.3	104.4	113.0	133.6	119.4	95.1	85.8	89.0	89.5	90.3
1958.....	79.7	85.6	87.2	91.7	109.0	135.1	149.5	133.1	97.1	80.0	74.3	77.7
1947-58 ..	85.0	89.4	92.9	99.9	111.3	133.3	139.6	110.9	91.3	81.6	81.3	83.4



Seasonal changes in marketing charges contribute to wide seasonal variations in the farm-retail spread. As marketing charges increase in the first half of the year, the spread reaches a peak in early summer. As supplies of the new crop increase, the spread declines to a low in the fall. The seasonal amplitude of the farm value series increased substantially between 1947 and 1958. Amplitudes of the retail price and the spread also increased to some extent. All of these increases probably were due to erratic factors.

### Oranges

Variation in the volume of farm marketings for fresh market is the principal explanation underlying seasonal changes in prices of fresh oranges, but the volume purchased by processors, prices paid by these processors, and other factors also are important. Farm and retail prices of fresh oranges tend to drop seasonally in the last quarter of the calendar year as marketings increase (fig. 13). Available supplies of early and midseason oranges for fresh market usually taper off in mid-February, but these supplies soon are supplemented by marketings of Florida Valencia oranges, which begin in February and increase in March. During the first half of the year, however, particularly in January and February, the seasonal pattern of prices for fresh oranges in Florida frequently is affected by demand for and prices of oranges for processing. Processor prices tend to establish a floor under fresh market prices. Despite a relatively high level of farm marketings in Florida during February, March, and April, fresh-market farm prices usually increase seasonally, partly because processors' purchases during this period usually are large.

Marketings of Florida oranges are negligible during the summer. Thus, orange prices during the summer and early fall are governed largely by supplies of California Valencias, most of which go to the fresh market. As supplies of California Valencias dwindle, farm prices increase to a peak in September.

Farm and retail prices of oranges tended to rise during the spring and summer and decline in the fall, but changes in the retail price were smoother than changes in the farm value, the differences being absorbed by the marketing margin. Month-to-month changes in the farm-retail spread tended to be inversely related to changes in farm value, but both indexes reached a peak in the fall and declined in November and December. Amplitudes of variation in the seasonal indexes of retail price and spread were not as great as in the farm-value index.

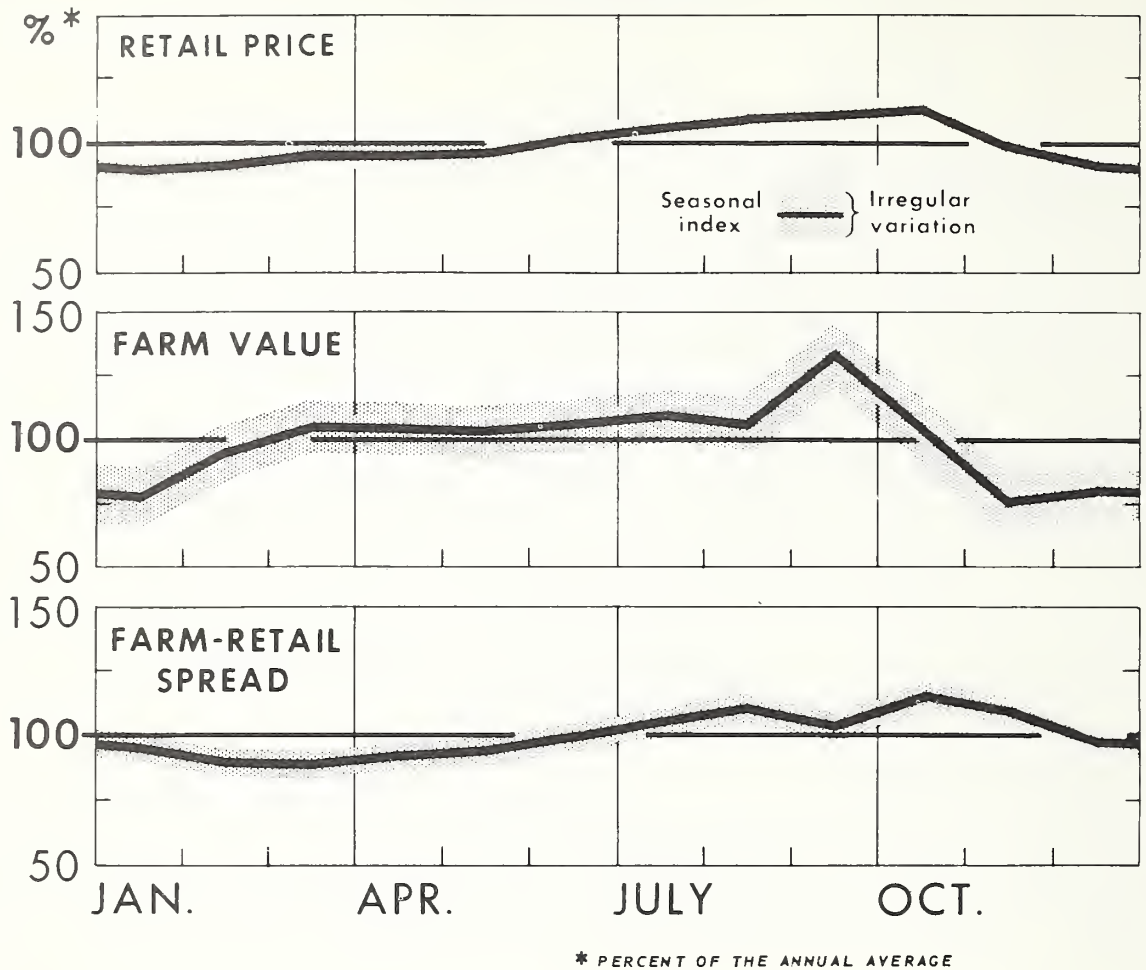
Month-to-month changes in prices and spreads were explained more by the seasonal component than by the irregular component (table 1). In the spring and summer, however, the farm value often deviates widely from the normal seasonal movement, reducing reliability of the seasonal index in those months.

### Fresh Vegetables

Seasonal variation was considerably smaller for fresh vegetables as a group than for most of the individual commodities within the group (fig. 14). The farm value, retail cost, and farm-retail spread were seasonally high in the spring, when supplies were light and shipments from California, Florida, and Texas made up a relatively large proportion of the market supply. In Florida, California, and some other States, farm prices of most vegetables are quoted f.o.b., which usually includes costs of packing, grading, and other services. In other producing areas, prices quoted usually are for produce at the farm or delivered at a local packinghouse, without these service costs. As supplies of fresh vegetables in these areas increase, prices and margins generally decline from spring to fall. The spread usually moved in the same direction as farm

Seasonal Indexes, 1947-58

# ORANGES



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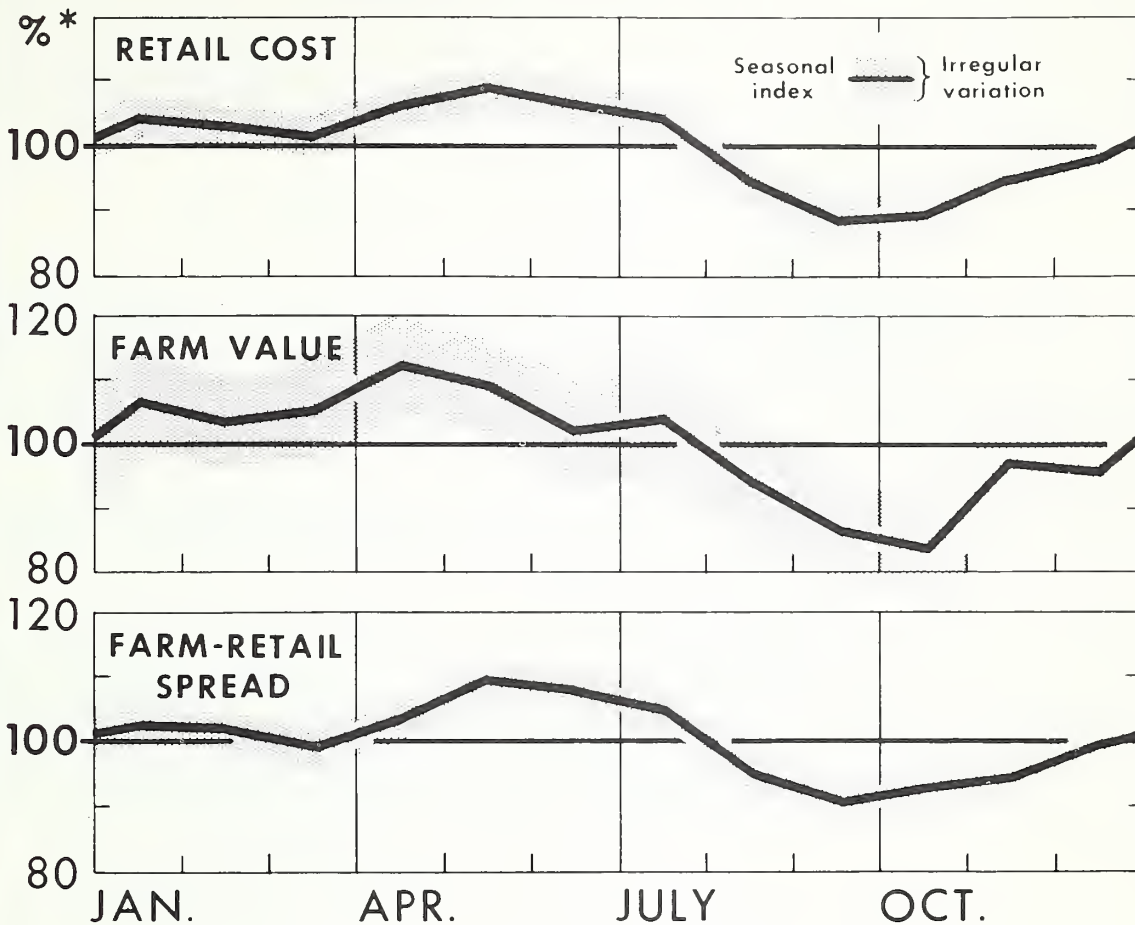
Figure 13

Table 19.--Oranges: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Retail cost:												
1947.....	88.2	89.7	97.4	96.7	98.3	100.5	104.7	114.4	111.8	113.5	96.5	88.6
1958.....	92.8	93.3	94.0	98.9	97.2	100.1	104.9	106.0	111.0	110.8	101.1	90.0
1947-58 ..	90.1	91.8	94.4	94.9	96.9	100.8	106.1	109.2	110.9	113.5	99.5	91.9
Farm value:												
1947.....	69.5	96.1	112.6	106.5	98.8	94.1	121.9	113.2	139.0	101.2	71.7	75.3
1958.....	85.1	98.0	102.8	113.1	103.1	105.4	103.3	106.4	128.2	101.6	80.9	72.2
1947-58 ..	78.3	95.2	105.0	104.0	102.5	106.3	108.8	106.5	133.1	103.2	76.8	80.4
Farm-retail spread:												
1947.....	95.4	87.4	91.1	92.9	97.1	102.1	99.0	115.7	104.3	119.1	102.9	93.2
1958.....	96.6	91.2	90.3	93.0	94.9	98.4	105.3	105.4	100.4	113.9	111.2	99.3
1947-58 ..	95.2	90.6	89.6	92.0	94.3	99.0	105.0	110.7	102.6	115.0	108.9	97.0

Seasonal Indexes, 1947-58

# FRESH VEGETABLES



\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7846-60 (4) AGRICULTURAL MARKETING SERVICE

Figure 14

Table 20.--Fresh vegetables: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Retail cost:</b>												
1947.....	102.0	106.1	102.6	109.3	111.0	105.3	101.5	92.7	90.3	88.1	94.5	96.8
1958.....	101.5	100.9	103.7	109.9	112.7	106.0	104.6	95.4	88.6	89.9	92.2	94.7
1947-58 ..	104.3	103.1	101.6	106.3	109.3	106.4	104.1	94.6	88.1	89.0	95.0	98.2
<b>Farm value:</b>												
1947.....	103.9	112.1	105.3	117.1	112.5	98.6	96.5	90.2	87.6	84.0	93.0	99.2
1958.....	100.3	96.9	107.8	117.2	112.0	102.4	110.1	94.6	89.3	87.9	95.0	86.5
1947-58 ..	106.8	103.3	105.2	111.9	109.3	102.1	103.8	94.1	86.6	83.7	97.2	95.9
<b>Farm-retail spread:</b>												
1947.....	100.2	101.6	100.3	103.5	109.2	109.1	104.9	94.3	92.5	91.3	96.1	96.9
1958.....	102.3	102.9	100.0	106.1	113.4	106.5	102.3	96.1	89.9	91.0	91.3	98.1
1947-58 ..	102.3	102.0	99.3	103.3	109.5	107.6	104.6	94.9	90.1	92.5	94.0	99.9

and retail prices, indicating that marketing agencies tended to apply a percentage markup to fresh vegetables.

The seasonal component explained more of the month-to-month changes in the retail price and the spread for the fresh vegetable group than did the irregular component. Irregular factors, however, had more influence on the farm value than did seasonal factors. Neither the seasonal index of the retail price nor that of the farm-retail spread shifted significantly from 1947 to 1958 (table 20). The 1958 farm-value index differed considerably from the 1947 index in February, July, and December, but it is doubtful if the differences were significant.

### Green Beans

The farm value, farm-retail spread, and retail price of green (snap) beans are highest in the first quarter, when marketings reach a seasonal low, and are lowest in the late summer and early fall, when marketings are relatively heavy. Month-to-month changes in the farm value, farm-retail spread, and retail price usually were in the same direction, but amplitude in the farm value was larger than that in either the retail price or the farm-retail spread (fig. 15).

Close similarity in the seasonal patterns of all three series indicated that marketing agencies tended to establish margins which represented constant percentages of procurement prices. When farm and retail prices were high, the margin was large; when prices were low, the margin was small.

Irregular fluctuations, which accounted for a large part of the variation in farm and retail prices of snap beans, reduced the reliability of the seasonal indexes for predictive purposes. In addition, year-to-year fluctuations in the seasonal pattern were often large and variable. Usually farm and retail prices and the spread were above their annual averages during the first quarter and below the averages during the third quarter. In some years, however, prices departed widely from this pattern. Price patterns in the second and fourth quarters varied from year to year.

### Cabbage

Production of cabbage reaches a peak in the fall, but it remains fairly high throughout the winter. Farm prices usually are below the annual average during months of heavy production, but adverse weather can affect "normal" seasonal price movements significantly.

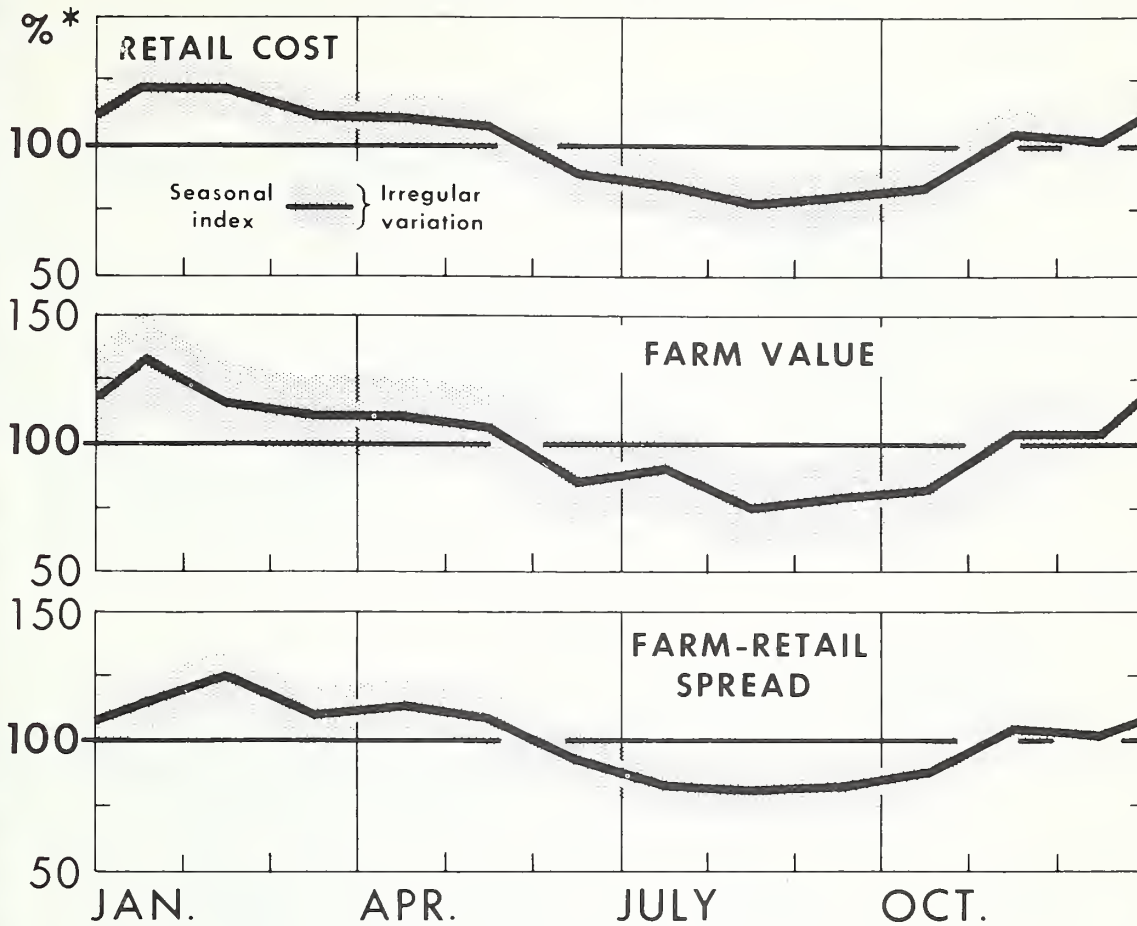
During the 12-year period 1947-58, the farm value usually was below the annual average in September, October, and November, and consistently above in July and August (fig. 16). In other months, the farm value varied from year to year relative to its annual average.

Like farm prices, retail prices of cabbage usually were seasonally low in the fall. Seasonally high retail prices, however, occurred earlier in the year than did seasonally high farm values. Retail prices did not fluctuate seasonally as much as farm prices.

The farm-retail spread ordinarily was below the annual average during the second half of the year, when cabbage moves to market from local producing areas throughout most of the Nation. In the winter and spring, however, cabbage comes mainly from Florida, Texas, and California. Transportation charges, therefore, are higher during these seasons. Since cabbage is semiperishable and bulky and requires little special handling between farms and retail outlets, transportation charges account for much of the spread. Changes in transportation charges resulting from seasonal shifts in sources of supply have a large effect on the farm-retail spread and largely explain seasonal changes in the spread.

Seasonal Indexes, 1947-58

# GREEN BEANS



\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7847-60 (4) AGRICULTURAL MARKETING SERVICE

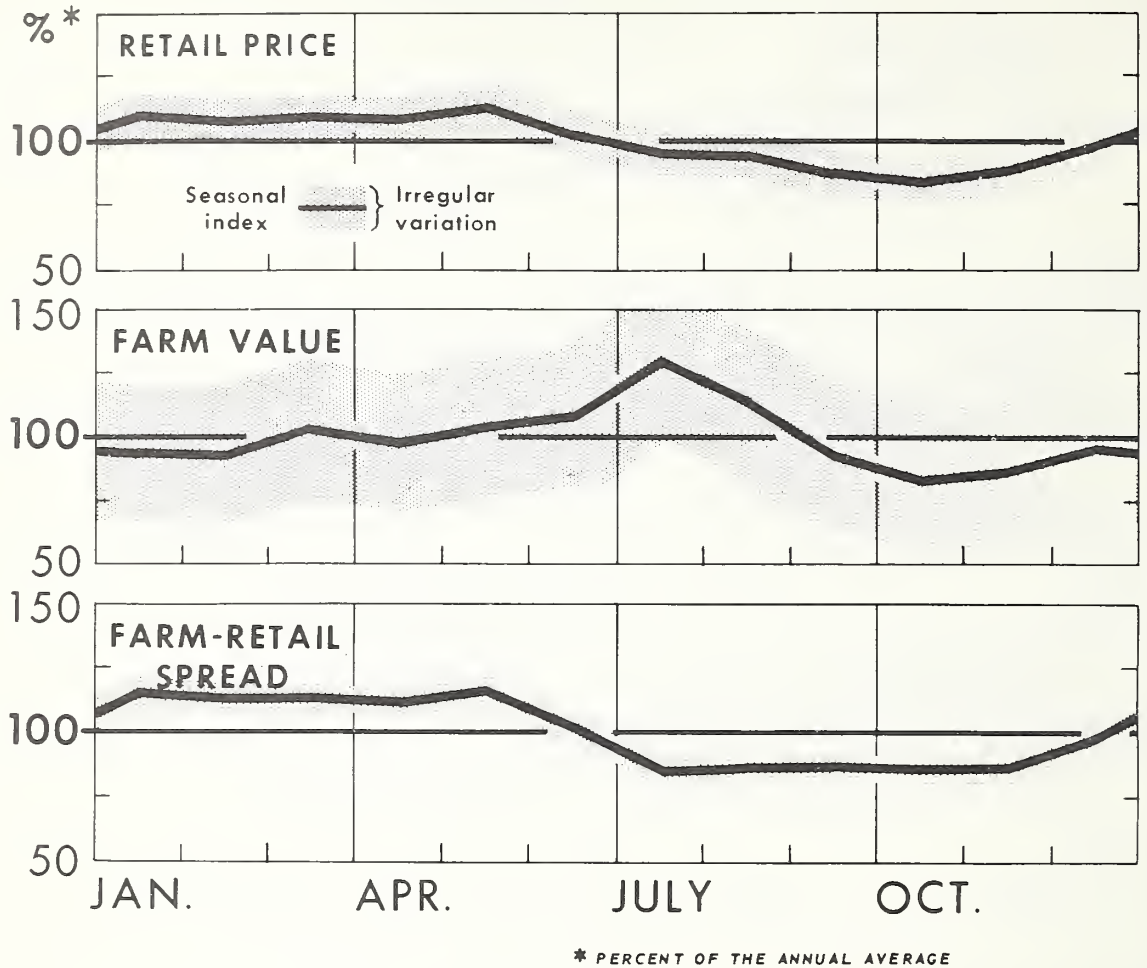
Figure 15

Table 21.--Green beans: Seasonal indexes for retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Retail cost:</b>												
1947.....	103.0	124.3	106.6	123.3	107.5	90.6	85.0	77.0	83.6	81.7	116.5	100.8
1958.....	123.2	130.6	134.9	107.7	108.3	86.6	86.7	76.2	78.1	87.1	89.9	90.7
1947-58 ..	123.0	122.2	111.4	111.1	107.3	89.2	86.0	78.5	80.6	84.5	105.0	101.2
<b>Farm value:</b>												
1947.....	104.5	128.7	102.4	135.6	114.5	80.7	83.6	69.5	81.4	81.1	116.2	101.9
1958.....	119.4	125.7	151.5	98.7	106.4	80.5	105.0	79.8	81.3	87.4	83.3	81.1
1947-58 ..	133.5	116.3	110.4	110.2	106.0	85.5	91.7	76.7	80.3	82.7	103.2	103.4
<b>Farm-retail spread:</b>												
1947.....	102.5	119.5	108.5	112.3	100.8	96.6	85.3	81.8	85.7	87.4	118.0	101.9
1958.....	126.6	133.3	117.9	114.2	108.5	91.1	73.7	74.2	76.2	88.3	96.1	99.7
1947-58 ..	114.4	125.0	109.7	112.0	108.8	92.5	82.4	80.5	81.2	87.6	104.4	101.5

Seasonal Indexes, 1947-58

# CABBAGE



U. S. DEPARTMENT OF AGRICULTURE

NEG. 7848-60 (4) AGRICULTURAL MARKETING SERVICE

Figure 16

Table 22.--Cabbage: Seasonal indexes for retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Retail cost:</b>												
1947.....	107.0	104.3	103.9	107.4	122.5	105.7	90.4	99.7	85.7	84.3	87.8	101.3
1958.....	107.6	110.2	115.1	118.5	110.6	100.8	94.4	90.2	90.2	86.5	84.3	91.6
1947-58 ..	109.1	107.5	109.0	108.3	113.3	101.2	95.9	95.1	88.2	84.6	88.1	99.5
<b>Farm value:</b>												
1947.....	85.8	79.4	84.8	89.6	109.5	112.9	124.5	120.1	91.5	93.8	96.0	112.1
1958.....	96.6	125.9	109.3	122.8	83.1	100.7	119.7	103.6	97.2	78.8	75.8	86.6
1947-58 ..	93.9	93.0	102.4	97.5	102.8	107.7	129.6	114.3	93.0	83.7	86.6	95.4
<b>Farm-retail spread:</b>												
1947.....	115.0	113.9	110.7	110.0	126.3	103.3	80.3	88.1	86.0	83.1	85.8	97.6
1958.....	111.5	102.8	118.1	117.6	119.6	101.7	86.1	85.3	87.2	89.0	87.5	93.5
1947-58 ..	115.5	113.1	112.2	111.6	116.4	101.3	85.4	86.2	87.2	85.9	86.9	98.3

Fluctuations in farm and retail prices stemming from the influence of irregular factors were much larger than fluctuations due to seasonal factors. Variation in crop maturity dates, especially in the spring, is one of the irregular factors causing sharp changes in price. These irregular factors tend to reduce the value of the seasonal indexes for predicting price changes, particularly during the first half of the year. Thus, changes in farm and retail prices may not always follow the seasonal patterns indicated in figure 16.

#### Lettuce

California and Arizona produce nearly 85 percent of the commercial supply of lettuce, and marketings fluctuate little from season to season. This crop is highly perishable, so prices adjust quickly to changes in supplies. Thus, week-to-week changes in marketings and prices probably are closely related, but these erratic movements in prices are not repetitive from year to year. Small seasonal variations in prices and spreads are overshadowed by these and other irregular factors, which decrease the value of the seasonal indexes in forecasting changes in prices and spreads. The irregular-seasonal ratio (table 16) was relatively high, indicating a weak relation between seasonal movements and actual changes in the retail price, farm value, and farm-retail spread.

Seasonal indexes of the retail price and the farm-retail spread usually moved in the same direction. The farm value often moved in the same direction as the retail price, but the magnitude of change was greater in the farm value (fig. 17).

#### Tomatoes

Seasonal variations in supplies and seasonal shifts in areas of production cause wide variations in the retail price, farm value, and farm-retail spread of tomatoes (fig. 18). Tomatoes are grown in most sections of the country during the summer, but during the winter, domestic supplies come mainly from Florida. These domestic supplies are supplemented by imports. Limited supplies and high costs of production during the winter caused relatively high farm values of tomatoes in those months. During the spring and summer, when marketings expanded, the seasonal index of the farm value declined in each month except July. In July over one-third of the supplies came from California, where prices are reported on an f.o.b. basis. This was a possible reason for the increase in July. Marketings contracted during the fall, causing the farm value index to increase.

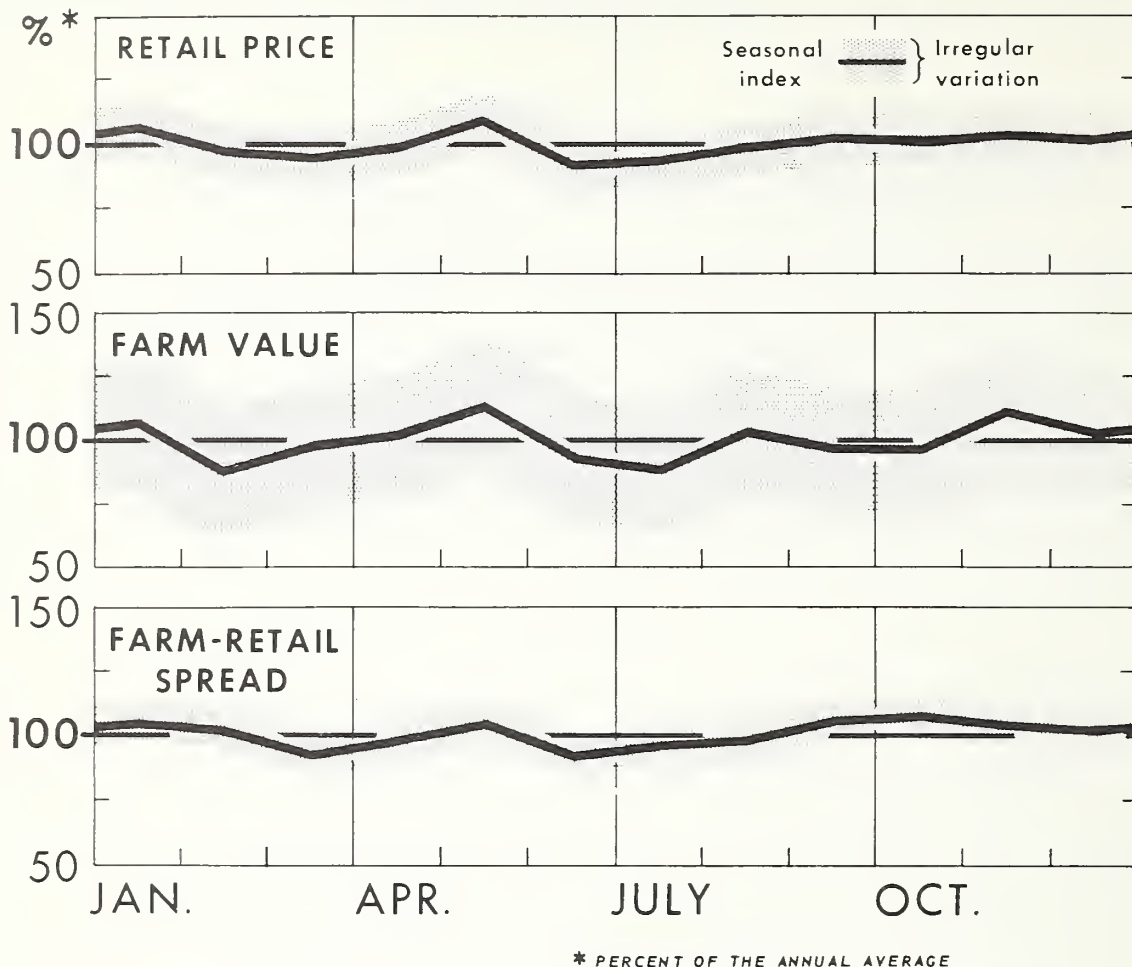
All three series reached a low in September, but each reached a high in different months during the spring. Fluctuations in original prices and spreads were large, but seasonal factors accounted for more of the variation than did irregular factors.

#### Carrots

The 1958 seasonal indexes for the farm value of carrots declined sharply in the first 3 months to a low in the early spring, then rose rapidly to a peak in midsummer (fig. 19). A decline later in the summer was followed by a slight rise in the fall. Seasonal lows in the spring were partly accounted for by heavy marketings of carrots from Texas, which usually are relatively low-priced. The high in midsummer is accompanied by light marketings, nearly all of which come from California, where relatively high farm prices prevail. These higher prices include such marketing services as washing, grading, and packing. Farm prices of carrots from Texas do not usually include these service costs. Marketings of carrots reach a peak during the late summer and fall, when most of the carrots come from California and several northern States.

Seasonal Indexes, 1947-58

# LETTUCE



U. S. DEPARTMENT OF AGRICULTURE

NEG. 7849-60(4) AGRICULTURAL MARKETING SERVICE

Figure 17

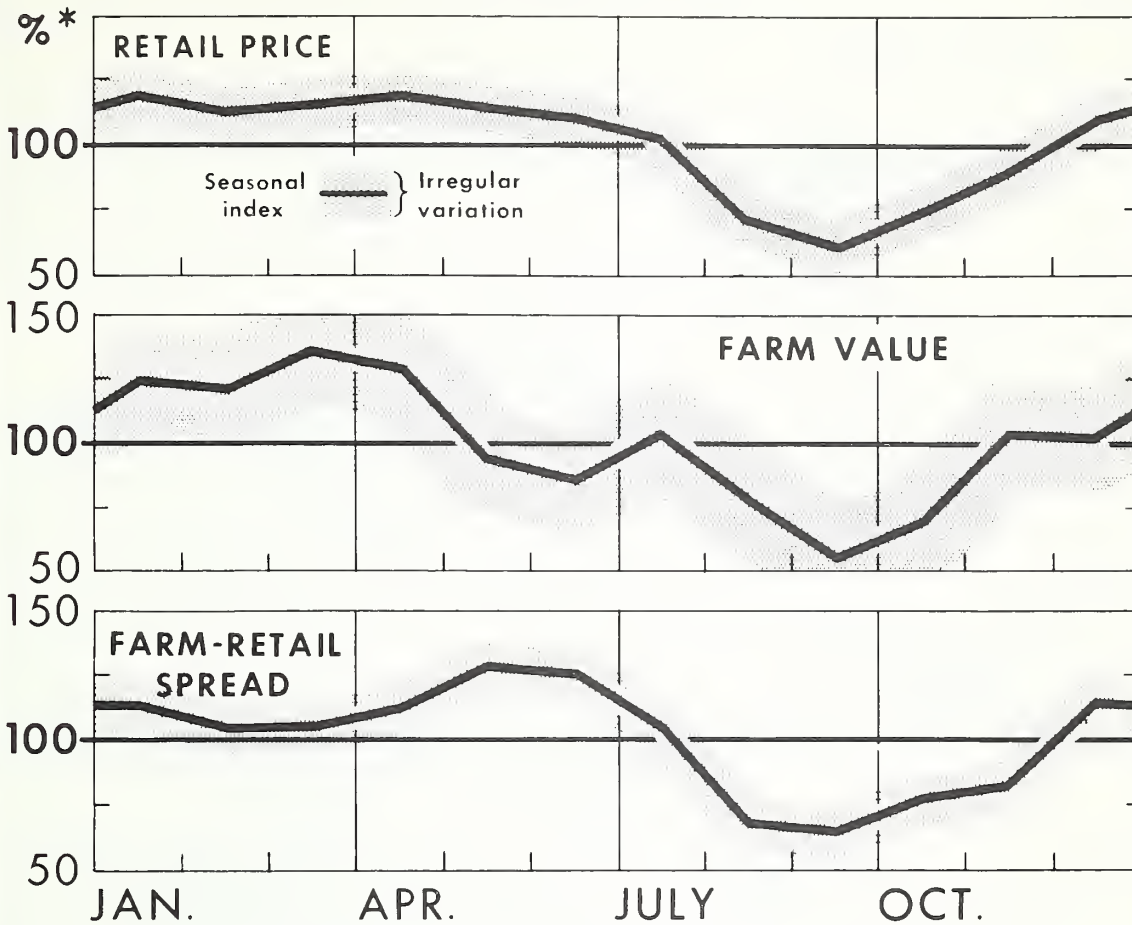
Table 23.--Lettuce: Seasonal indexes for retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Retail cost:												
1947.....	109.0	104.0	93.4	95.4	116.8	91.4	95.6	97.0	105.9	94.2	99.2	98.1
1958.....	96.7	92.1	95.0	99.4	103.4	97.6	101.2	106.7	102.1	107.3	101.6	96.9
1947-58 ..	106.1	97.8	95.0	99.5	108.9	92.0	93.9	99.6	101.2	100.7	104.1	101.2
Farm value:												
1947.....	111.1	108.1	85.5	97.5	135.8	89.9	93.8	101.9	102.1	85.8	86.3	102.2
1958.....	93.4	75.6	107.6	97.8	102.9	104.3	93.1	104.9	100.9	123.9	98.5	97.0
1947-58 ..	106.7	88.3	97.6	100.6	112.4	93.8	88.8	103.1	97.5	97.3	111.2	102.7
Farm-retail spread:												
1947.....	108.3	99.2	98.4	93.2	100.7	93.7	91.7	93.4	108.6	105.8	110.1	97.0
1958.....	99.1	101.3	87.6	99.8	103.1	93.1	103.6	105.0	102.5	100.8	106.7	97.6
1947-58 ..	103.4	100.1	92.4	97.4	104.0	92.3	95.9	97.5	104.8	107.1	103.7	101.6



Seasonal Indexes, 1950-58

# TOMATOES



BASED ON DATA FOR 1950-58

\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7850-60 (4) AGRICULTURAL MARKETING SERVICE

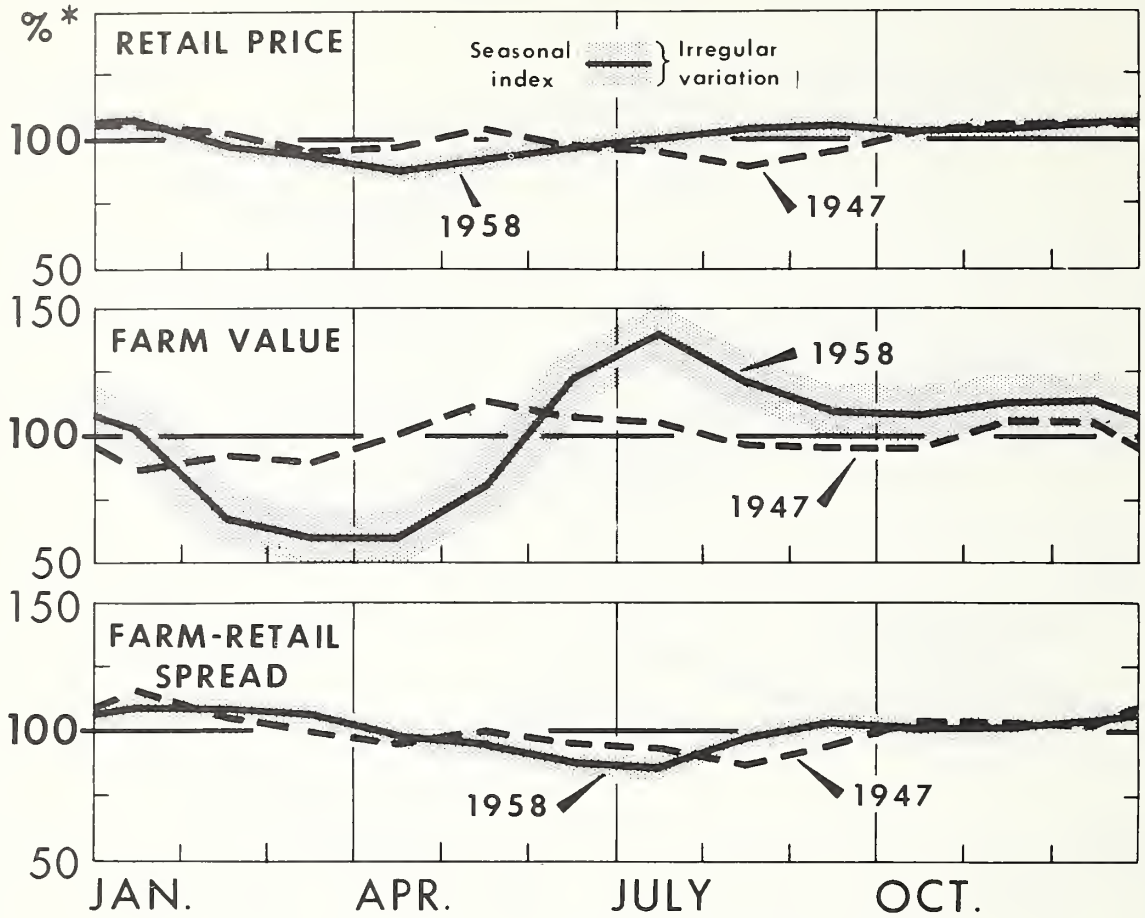
Figure 18

Table 24.--Tomatoes: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1950-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Retail cost:</b>												
1950.....	129.3	115.5	109.0	114.0	103.3	115.3	110.9	68.0	53.8	76.9	88.3	115.6
1958.....	114.2	110.2	121.0	129.5	131.3	105.2	92.3	69.5	63.5	73.5	88.5	101.2
1950-58 ..	119.6	111.8	116.7	119.4	114.6	110.2	102.7	71.3	60.3	74.6	89.6	109.2
<b>Farm value:</b>												
1950.....	150.2	141.8	120.0	131.6	83.8	86.2	104.8	68.3	44.3	69.6	91.0	108.4
1958.....	117.3	98.1	130.4	146.3	112.2	79.4	93.5	83.0	61.7	71.9	118.4	87.8
1950-58 ..	124.2	121.9	135.1	128.7	93.6	86.2	103.2	78.2	54.9	70.0	102.4	101.5
<b>Farm-retail spread:</b>												
1950.....	108.7	93.3	98.4	103.6	118.5	139.1	118.7	69.5	61.7	80.3	87.8	120.4
1958.....	112.4	115.6	113.4	117.8	142.5	118.5	92.4	64.1	65.4	75.2	73.0	109.5
1950-58 ..	113.3	103.9	104.8	113.4	128.5	125.8	104.3	67.3	64.5	77.5	82.7	113.9

Seasonal Indexes

# CARROTS



\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7854-60 (4) AGRICULTURAL MARKETING SERVICE

Figure 19

Table 25.--Carrots: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Retail cost:												
1947.....	106.5	101.6	96.3	97.3	104.1	98.6	95.1	90.5	95.7	102.5	105.6	106.4
1958.....	107.0	97.8	94.2	88.5	93.4	98.0	99.9	103.9	105.1	102.2	103.9	106.4
1947-58 ..	107.1	98.3	93.8	91.3	96.9	98.0	98.6	98.2	101.1	102.2	106.3	108.3
Farm value:												
1947.....	87.0	93.2	90.0	100.5	114.3	107.4	105.2	98.2	95.8	95.7	106.7	105.8
1958.....	101.7	67.8	58.9	59.4	81.7	122.2	140.6	121.1	110.6	108.1	113.7	114.4
1947-58 ..	98.2	82.0	73.1	81.8	101.4	115.8	122.5	105.3	99.2	91.6	112.6	116.4
Farm-retail spread:												
1947.....	116.2	105.2	99.3	95.3	99.5	96.2	94.9	87.0	95.3	104.7	104.1	102.0
1958.....	109.4	108.9	106.7	98.6	95.0	88.7	85.6	98.0	103.7	100.8	100.9	103.8
1947-58 ..	111.2	105.0	102.0	94.0	94.0	91.2	90.3	95.1	101.9	106.8	104.3	104.1

The 1958 retail price index declined in the first few months of the year, then increased almost continuously to a peak in December.

Seasonal changes in the farm-retail spread were nearly inverse to those in the farm value, because of wide movements in the farm value index relative to retail price movements.

The wide shift in the farm-value seasonal pattern between 1947 and 1958 was due largely to shifts in importance of production areas. The proportion of total marketings in January-April supplied by Texas increased between 1947 and 1958. This change caused the farm value to be lower in these months in the 1958 index than in the 1947 index, because prices were lower in Texas than in competing areas. California increased its share of the quantity marketed during the summer and fall; prices received by farmers in California were higher than in other areas.

### Onions

Onion marketings are heaviest in the fall, which results in low seasonal prices then (fig. 20). As supplies diminish, prices usually rise throughout the winter and spring, then decline through the summer as supplies increase. However, marketings from Texas and California during the spring tend to moderate the rise in prices. Supplies of Texas onions, which are marketed during the spring, vary considerably from year to year because of wide variations in the number of acres planted and in the weather. As a result, prices during the spring varied widely from year to year. Seasonal changes in the retail price and farm value were in the same direction, but changes in the retail price were smaller. Seasonal variations in the farm-retail spread were smaller than those in either of the other two series. Like farm and retail prices, the spread reached a low in the fall. The high in the spread occurred later than did the highs in the retail price and farm value.

Irregular price fluctuations appeared to be much more important than seasonal fluctuations in explaining movements in the farm value. However, during 1947-58, the farm-value indexes always declined sharply during the summer and were lowest in September and October. Seasonal indexes for the winter and spring months were erratic from year to year, reducing the value of the seasonals in forecasting changes in prices and spreads during the first half of the year.

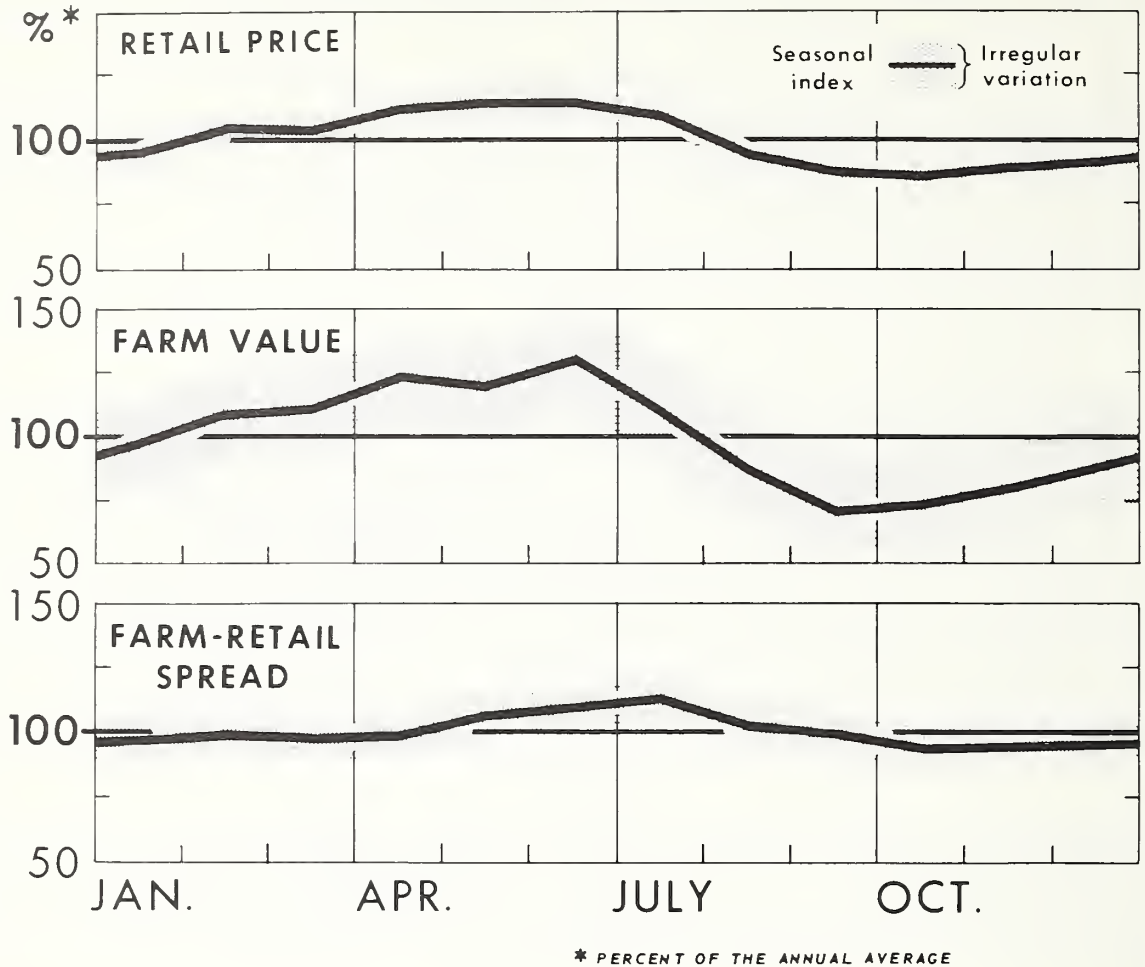
### Potatoes

Although potatoes are harvested in most months of the year, nearly 80 percent are harvested in late summer and fall. Marketings also are heaviest in the fall, but most of the fall production goes into storage. These storage supplies move into retail channels from fall until the following June. Prices of potatoes usually declined seasonally in the late summer and fall and remained relatively low to the end of the year (fig. 21). Seasonal price patterns were unstable in the spring, when prices are governed mainly by the quantity and quality of fall potatoes left in storage and of early-crop potatoes from California and the southern States.

The seasonal index of the farm-retail spread was highest during the spring and summer, when potatoes from California and the southern States account for a large part of the supply. Transportation costs are relatively high on California potatoes marketed in the East.

Seasonal Indexes, 1947-58

# ONIONS



U. S. DEPARTMENT OF AGRICULTURE

NEG. 7851-60 (4) AGRICULTURAL MARKETING SERVICE

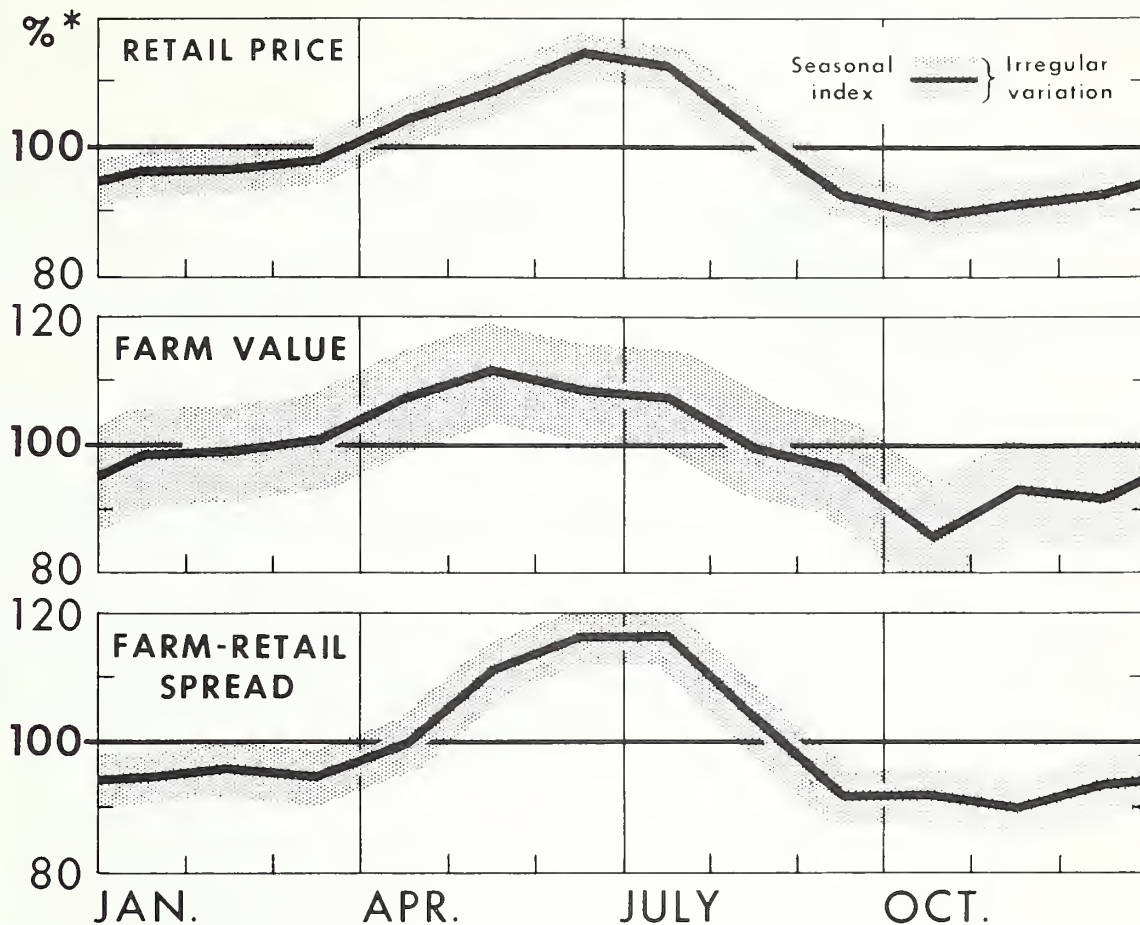
Figure 20

Table 26.--Onions: Seasonal indexes for retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Retail cost:</b>												
1947.....	100.1	114.1	114.5	126.7	112.6	104.8	101.2	85.4	80.2	79.3	87.5	93.6
1958.....	88.8	93.0	98.3	115.6	118.5	122.7	116.4	99.9	89.2	86.0	85.0	86.5
1947-58 ..	96.3	102.7	102.8	111.9	113.7	114.2	109.0	95.2	87.5	85.8	89.0	92.0
<b>Farm value:</b>												
1947.....	112.6	120.5	130.2	148.9	104.6	100.2	89.9	77.9	63.3	73.1	82.9	95.8
1958.....	79.2	95.2	121.9	126.8	126.9	180.0	117.4	77.4	66.0	67.2	68.3	73.7
1947-58 ..	97.7	108.8	110.6	123.3	120.3	130.3	108.3	87.0	71.6	73.8	80.4	87.9
<b>Farm-retail spread:</b>												
1947.....	94.8	99.5	92.8	93.3	116.4	108.7	114.4	94.7	100.8	91.0	95.7	97.9
1958.....	92.7	93.7	88.8	97.0	116.6	108.1	115.8	112.3	99.9	92.8	91.1	91.3
1947-58 ..	96.7	98.5	96.9	98.0	106.0	109.2	111.8	101.2	99.3	93.5	94.0	95.0

Seasonal Indexes, 1947-58

# POTATOES



\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7852-60 (4) AGRICULTURAL MARKETING SERVICE

Figure 21

Table 27.--Potatoes: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Retail cost:</b>												
1947.....	98.3	100.6	102.2	106.5	110.6	114.0	110.2	97.5	91.1	88.1	88.5	92.2
1958.....	93.0	94.0	100.7	110.7	111.6	111.6	112.5	102.8	93.0	89.6	89.7	90.8
1947-58 ..	96.5	96.9	98.0	104.2	108.8	114.2	112.7	102.4	92.7	89.7	91.0	92.9
<b>Farm value:</b>												
1947.....	104.2	105.4	105.8	113.3	107.1	102.7	100.0	92.8	93.4	87.0	92.9	95.6
1958.....	91.5	95.8	105.5	116.4	114.8	104.3	113.2	101.8	98.4	83.9	88.4	85.9
1947-58 ..	98.5	99.1	100.2	107.4	111.7	108.5	107.4	99.5	96.6	85.9	93.3	91.9
<b>Farm-retail spread:</b>												
1947.....	92.3	95.7	98.5	99.2	113.8	124.6	120.8	102.7	89.3	89.3	85.0	88.9
1958.....	95.8	94.5	93.4	106.4	111.2	112.5	111.8	103.4	91.8	92.4	91.8	94.8
1947-58 ..	94.7	96.0	94.8	99.8	111.1	116.6	116.5	103.9	91.4	91.5	90.0	93.6

Irregular fluctuations accounted for more of the month-to-month variation in the farm value than did seasonal fluctuations, but seasonal factors accounted for a slightly higher proportion of the variation in the retail price and in the farm-retail spread. Thus, seasonal indexes for the spread and the retail price are considered a little more reliable than those for the farm value.

### Sweetpotatoes

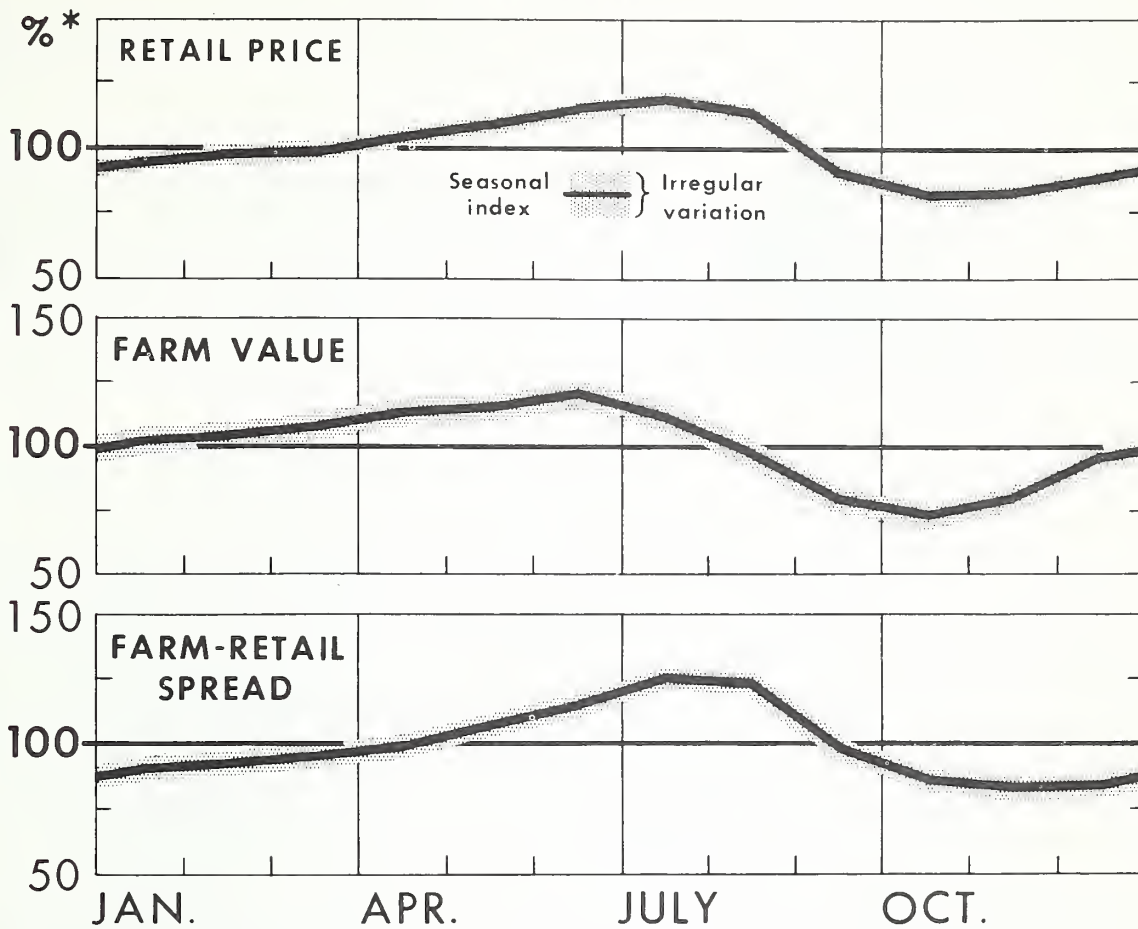
Sweetpotatoes, unlike white potatoes, are harvested only in the summer and fall, except for small supplies from Florida. Farm prices were seasonally lowest in September and October when harvesting is at its peak (fig. 22). The seasonal pattern of retail prices was about the same as that for the farm value, but the retail price changed direction about one month after the farm value. Amplitude of the retail-price seasonal index remained about the same between 1947 and 1958, but the amplitude of the farm value increased.

Increases in the farm-retail spread index during the first half of the year may reflect increased costs of marketing during those months and the tendency of marketing agencies to use a percentage markup. The farm value began to decline in the summer, but the retail price remained at a high level. As a result, the spread also remained high during the summer. The retail-price index continued to decline for a short time after the farm-value index turned up, causing the spread to continue down until late in the year.

Average month-to-month seasonal changes in price were much greater than irregular changes. The seasonal factor was more important in explaining month-to-month variations in prices and spreads for sweetpotatoes than for any other commodity in the fresh vegetable group.

Seasonal Indexes, 1947-58

# SWEETPOTATOES



\* PERCENT OF THE ANNUAL AVERAGE

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7853-60 (4) AGRICULTURAL MARKETING SERVICE

Figure 22

Table 28.--Sweetpotatoes: Seasonal indexes of retail cost, farm value, and farm-retail spread, 1947-58

Series and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Retail cost:</b>												
1947.....	94.4	97.9	98.7	102.7	107.1	120.4	116.7	114.2	93.8	82.9	82.7	88.3
1958.....	94.3	96.6	99.6	102.7	109.5	114.5	121.8	117.8	90.1	83.4	82.5	87.2
1947-58 ..	95.0	97.3	99.5	103.7	109.3	116.5	119.4	114.8	90.9	82.2	82.5	88.8
<b>Farm value:</b>												
1947.....	98.7	102.6	104.4	105.3	110.6	117.5	108.7	105.9	91.3	79.1	82.6	93.4
1958.....	103.3	107.2	104.1	116.5	120.6	125.7	118.2	85.4	66.2	70.8	78.0	103.8
1947-58 ..	101.5	104.1	106.8	112.5	115.7	121.2	111.1	97.6	77.9	74.1	81.0	96.6
<b>Farm-retail spread:</b>												
1947.....	92.1	94.4	95.0	100.3	105.1	122.2	122.7	118.8	95.8	86.3	82.8	84.3
1958.....	89.3	91.0	96.6	96.3	104.5	108.6	124.0	134.5	102.0	88.8	85.3	79.3
1947-58 ..	90.8	92.5	95.2	98.8	106.5	114.7	125.3	124.7	98.7	85.9	82.8	84.1

## APPENDIX

### Method of Computing Seasonal Indexes

The following is an abbreviated description of the method used by the Bureau of the Census in computing the seasonal indexes contained in this report. It is an excerpt from an article by Julius Shiskin, chief economic statistician at the Bureau of the Census, U. S. Department of Commerce. Those desiring a more detailed explanation may wish to see the footnoted references. <sup>4/</sup>

"An adaptation of a widely used method of measuring seasonal variations (the ratio-to-moving-average method) was programmed for the Census Bureau's electronic computers. There were three principal reasons for selecting this method, rather than some other: (i) It had been thoroughly tested in the past and had proved satisfactory for a large variety of economic series; (ii) it permits checking and analysis at each of the many stages in the seasonal adjustment process; and (iii) it had been almost universally accepted by economists and business analysts, who are the chief users of seasonally adjusted data. . . .

"The first step in the ratio-to-moving-average method is to compute a 12-month moving average--that is, a series of averages for successive 12-month periods (January to December, February to January, March to February, and so on). These annual averages eliminate the seasonal fluctuations and trace out, approximately, a 'trend-cycle curve.' Division of the raw data by this moving average yields a series of seasonal-irregular ratios. Since both the raw data and the moving average contain the trend-cycle component, it is canceled out (approximately) by division, leaving only the seasonal and irregular components. Estimates of the seasonal adjustment factors are then secured by averaging the seasonal-irregular ratios for successive Januaries, successive Februaries, and so on, in such a way that the irregular factor will be largely canceled out in the averaging process. Finally, the seasonal variations are eliminated from the original observations by dividing these observations by the seasonal adjustment factors. The resulting (seasonally adjusted) series contain the trend, cycle, and irregular factors, but not the seasonal factor.

"The adaptation of the ratio-to-moving-average method programmed at the Census Bureau takes advantage of the electronic computer's high-speed, low-cost computations; it utilizes more powerful and refined techniques than clerical methods widely used in the past, so it is likely to produce satisfactory results more frequently. It also produces more information about each series--information that can be used for checking the adequacy of the results, for forecasting seasonal and other movements, and for other purposes. The principal features of the method are summarized below, not with the expectation that the reader will follow them in detail, but to indicate the power and generality of the new method, as well as its limitations.

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<sup>4/</sup> Julius Shiskin, "Decomposition of Economic Time Series," Science, Vol. 128, No. 3338, pp. 1539-1546, Dec. 19, 1958. Mr. Shiskin was responsible for most of the development of the Census program for computing seasonal indexes. He also has presented several detailed papers on the method in addition to the article referred to above. More detailed statements may be found in economic and statistics journals as follows: (i) J. Shiskin, "Electronic Computers and Business Indicators," J. Business (Oct. 1957), republished as Occasional Paper No. 57 by the National Bureau of Economic Research, New York, N. Y.; (ii) J. Shiskin and H. Eisenpress, "Seasonal Adjustments by Electronic Computer Methods," J. Am. Statist. Assoc. (Dec. 1957), reprinted as Technical Paper No. 12 by the National Bureau of Economic Research, New York, N. Y.; and (iii) J. Shiskin, "Seasonal Adjustments of Economic Indicators," Proc. Business and Econ. Sect. Am. Statist. Assoc. (1957).



"The electronic computer first computes a preliminary seasonally adjusted series and then goes on to refine it. It utilizes a complex graduation formula--a weighted 15-month moving average applied to the preliminary adjusted series--to obtain the estimate of the trend-cycle curve. This average provides a smoother and more flexible curve than the simple 12-month moving average. A control-chart procedure is employed to identify extreme seasonal-irregular ratios, and the weight of these extreme ratios is systematically reduced in the subsequent computations. Weighted moving averages of the seasonal-irregular ratios for each month are employed to obtain a set of moving seasonal adjustment factors. A measure of the irregular component of each series is used to determine which of two moving averages to fit to the seasonal-irregular ratios. If the irregular component is relatively small, the machine selects a three-term moving average of a three-term moving average; if the irregular component is relatively large, it selects a three-term moving average of a five-term moving average for greater smoothing. Changing trends are taken into account in calculating seasonal adjustment factors for the full period of the series, including the first and last few years. For each month an average of the seasonal-irregular ratios for the last 2 years available is taken as the estimated value of each of the ratios for the 2 or 3 additional years required for the computations. These estimates provide the full amount of data required to compute the seasonal factors for the end years of the series. A similar procedure is used to obtain missing values for the beginning years of series and for computing the beginnings and ends of the trend-cycle curve.

"After the program computes seasonal factors--that is, a series estimating the seasonal component of the aggregate series and a seasonally adjusted series--it calculates a curve estimating the cyclical and trend factors in combination. This is accomplished by taking a weighted 15-term moving average of the final seasonally adjusted series. Finally, an irregular series is obtained by dividing the seasonally adjusted series by the cycle-trend curve. Thus, the time series representing the original observations is broken down into three separate series representing the seasonal, cyclical-trend, and irregular components of the aggregate series. . . .

"A group of summary measures of the seasonal, cyclical, and irregular components and the relations among them are also computed. The average monthly amplitude of the seasonal factor,  $\bar{S}$ , is obtained by averaging the month-to-month percentage changes in the seasonal factor curve without regard to sign. Similarly, the average monthly amplitude of the cyclical factor,  $\bar{C}$ , is obtained by averaging the month-to-month percentage changes in a weighted 15-month moving average of the seasonally adjusted series without regard to sign. Finally, the average amplitude of the irregular factor,  $\bar{I}$ , is computed by averaging the monthly percentage changes in the ratio of the seasonally adjusted series to the cyclical curve without regard to sign. The machine then uses these measures to compute various ratios of these amplitudes--for example, the ratio of the average amplitude of the irregular factor to the average amplitude of the cyclical factor."

